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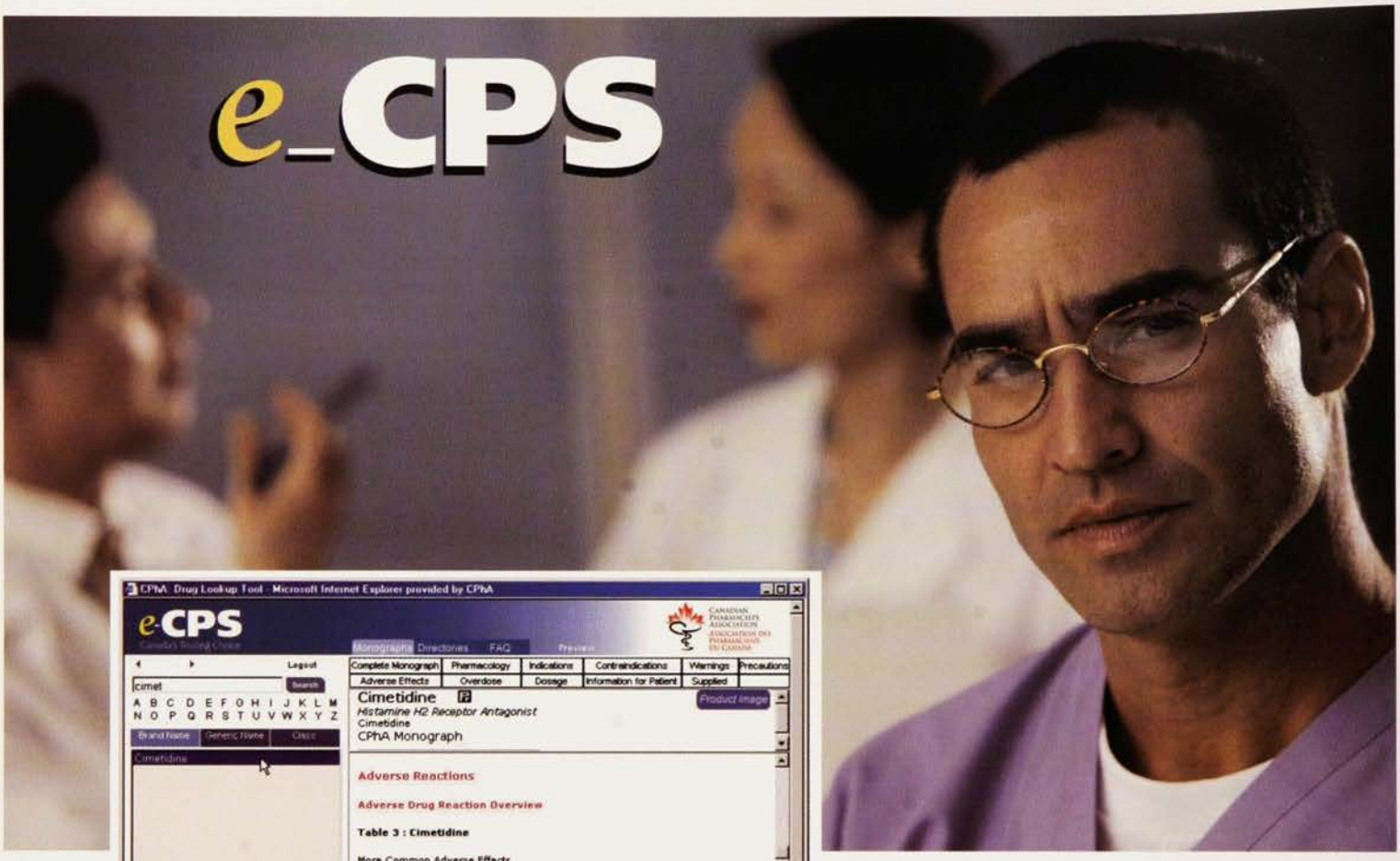

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Editorial

Changes

Leanne Tran, Editor-in-Chief

If we look at the field of obstetrics and gynecology, the feature topic of this issue, and compare it to even ten years ago, we would find that in terms of the practice structure, technology and lifestyle, there have been significant changes. These changes are indicative of the way that medicine in general is progressing. As stated by Dr. Paul Bernstein, an obstetrician and gynecologist at Mount Sinai Hospital in Toronto, "I personally think that [obstetrics and gynecology] will evolve into more sub-specialization, perhaps into surgical and non-surgical aspects. It would be practical to have streaming, as that would provide focus and improve resources for new clinicians". Upon reading this Profiles Interview, I noted that this trend is not isolated to obstetrics and gynecology but holds true for all of medicine. There is a noticeable shift of medicine towards greater specialization and focus on individual interests whether one is a family physician, an internist or a surgeon. This is inevitable; as we progress through medical school, postgraduate training, independent practice and yes, life, we are exposed to different ideas and people that shape our interests. Similarly, this issue of the UWOMJ is filled with a range of exciting topics that include pregnancy complications, technological developments, ethical debates, and psychosocial perspectives.

In particular, I would like to draw your attention to an article written by Dr. Gideon Koren, the Ivey Chair in Molecular Toxicology at UWO. I encourage all of you to read this as it serves as an introduction to the Motherisk Program that had its inception at the Hospital for Sick Children in Toronto and is now also operating at UWO. In addition to the start of the Motherisk Program here at UWO, I am pleased to inform you that there have been major developments to UWO's Global Health curriculum since the publication of the last issue of the journal. The Joint issue editorial entitled Physicians and Peace: Promoting Peace by Pursuing Health spoke about a new academic discipline, "Peace Through Health". Research has shown that health initiatives can not only foster health in a region of conflict but peace as well. Given the increasing awareness of the importance of global health, it is only appropriate that the journal give an update on UWO's contributions to this area. I believe that the piece The Next Wave: Medical Education Without Borders is particularly timely given the recent tsunami and the changes currently underway in academic and clinical medicine. The article emphasizes the unique opportunity that we as health care workers have in affecting the economic, political, legal and social network around us and in the process, promote peace by pursuing health. Above all, it reminds us to take a patient-centered, culturally sensitive, and globally conscious approach to medicine. With this in mind, I hope you enjoy reading this Obstetrics and Gynecology issue as much as we, at the medical journal, have enjoyed putting it together for you.

Prenatal Testing & Disability Rights: The Role of Healthcare Professionals

Tanya Raha, Meds 2006

Prenatal genetic diagnosis (PND) and pre-implantation genetic diagnosis (PGD) are becoming increasingly available as options for parents-to-be. Despite the benefits of both procedures, several ethically troublesome issues remain. In particular, disability rights advocates have expressed a number of concerns: the "expressivist" argument that such practices deem disabled individuals on a whole as unfit for living, that it accepts and encourages parental attitudes of selectivity and intolerance, that PND-related decisions are often based on misinformation or misconceptions, that it threatens the fair & equitable integration of disabled individuals as a part of our society and that it foretells a tendency towards eugenics. There is a variety of opinions on the use and practices of PND/PGD, both within and beyond the disabled community. As healthcare professionals who currently administer PND as a standard of care, our best response in addressing these concerns lies in improving "informed" consent by securing and providing good, usable, complete information about life with disability, especially as viewed by people who live with disability. It is also important to identify and work on our own attitudinal biases, since we come from a biomedical model where there is often a tendency to see disability firstly, if not exclusively, as something negative that should be 'fixed' or 'eliminated'. Lastly, healthcare professionals are well-positioned and arguably obligated to take on an advocacy role to ensure that our society is one which truly does hold the attitudes, services and support for parents to freely make their reproductive choice, whether that be to terminate a pregnancy or to have a potentially disabled child.

Over the past thirty years, prenatal genetic diagnosis (PND) for serious medical conditions has become available and established as the standard of care for treating pregnant women in Canada. PND in Canada currently includes the Maternal Serum Screen (MSS) and ultrasound screening tests which are offered to every pregnant woman, and if the woman is indicated to be at high risk for fetal anomaly it can include the more invasive diagnostic tests of amniocentesis, chorionic villus sampling (CVS) and further ultrasound.[1,2] More recently, with the development of in vitro fertilization (IVF) techniques, the practice of pre-implantation genetic diagnosis (PGD) for serious medical conditions has also come to the forefront.[3] Both PND and PGD are used to test for a variety of serious conditions: aneuploidy, neural tube defects, Cystic Fibrosis (CF), Huntington's Disease (HD), Tay Sach's disease, hemoglobinopathies and Muscular Dystrophy (MD) all qualify, with other possible conditions tested if such risk is indicated by a family history and/or carrier screening.[1,2]

PND in combination with the subsequent options to terminate or carry to term a pregnancy has given us many benefits in increasing client knowledge at times of reproductive decision-making, in reinforcing reproductive autonomy and choice, and in preventing serious medical conditions and the costs associated with their treatment.[4] Yet for all its merits, PND still leaves us grappling with challenging ethical and practical issues. While on an individual level it seems positive to inform and reinforce the reproductive autonomy of the parents and possibly prevent serious, debilitating medical conditions, decisions and actions such as these invariably (if inadvertently) have impact and convey messages at the public and political level. In particular with PND, one of the greatest concerns has been the impact on disabled individuals, hence we have what has been coined the "disability rights objections" to PND. One prong of this argument is the expressivist argument, which contends that PND and the selective abortion that often results to select against disabling traits express a hurtful attitude about, and send a hurtful message to people who live with those same traits.[5] Disability rights advocate Adrienne Asch notes, "As with discrimination more generally, with PND, a single trait stands in for the whole, the trait obliterates the whole...nobody finds out about the rest. The tests send the message that there's no need to find out about the rest,"[5] while Saxton notes, "The message at the heart of widespread abortion on the basis of PND is the greatest insult: some of us are "too flawed" in

our very DNA to exist; we are unworthy of being born..."[5]

A second morally problematic area is the parental attitude argument. According to it, using prenatal tests to select against some traits indicates a problematic conception of and attitude towards parenthood. Part of the argument is that PND is rooted in a "fantasy and fallacy" that "parents can guarantee or create perfection".[5] In addition, if prospective parents imagine that disability precludes everything else that could be wonderful about the child, they have made biology destiny in the way that critics of the medical model of disability consistently resist. Good parents will care about raising whatever child they receive and about the relationship they will develop, not about the traits the child bears. The "selective mentality" revealed in paying attention to particular traits supports a morally troubling conception of parenthood, a preoccupation with what is trivial and an ignorance of what is profound.[5]

A third criticism of PND and genetic termination is that it is based on misinformation, and that decisions depend on a misunderstanding of what life with disability is like. There are many widely accepted beliefs about what life with disability is like for children with disabilities and their families. Most of these are not based on data. They include assumptions that people with disabilities lead lives of relentless agony and frustration and that most marriages break up under the strain of having a child with a disability. Recent studies suggest, for example, that many members of the health professions view childhood disability as predominantly negative for children and their families, in contrast to what research on the life satisfaction of people with disabilities and their families has actually shown.[6,7] One study with individuals with CF and HD corroborates this view, where in nearly all twenty-four cases (except one) respondents reported their lives in fairly positive terms, on many occasions expressing contentment or happiness with the quality of life they experienced.[8] Similarly, three disability researchers analyzed empirical data on the impact of children with disabilities on families. Their review, surprising to many, concludes that the adaptational profiles of families that have a child with a disability basically resemble those of families that do not.[9] Irrespective of whether a child is healthy or disabled, on average, no one family has significantly more stress or adaptation challenges than the other.

Perhaps a most fundamental and irreconcilable disagreement over misinformation is what having a disability is "really" like for people: how much of the problem of disability is socially constructed? Nora Groce's work establishes that much of what is difficult about having a disability stems from manifold facets of society, from architecture to education to aesthetic preferences. In choosing how to construct our societies, we "choose who will be disabled", and if we were to choose differently, what's disabling about what we now call disabilities would be largely eliminated.[5] Indeed, healthcare professionals working in PND identify the inability of our society to care appropriately for disabled children as a major problem.[10] It is not unreasonable, furthermore, to have serious concerns that with the increasing use and accuracy of PND and genetic terminations, disabled individuals - already a minority - will become even smaller, less visible and possess less political clout, resulting in even less accommodation and social place in our society.

Tied perhaps to our inability to create an acceptable, equitable place for disabled individuals within our society is a growing intolerance for 'abnormal' individuals. Healthcare professionals working in PND in France cited the request for abortion in the case of minor anomalies such as Klinefelter or Turner syndromes, cleft palate, or blindness as being the most frequent ethical dilemma that they were presented with, along with instances where diagnosis and prognosis are uncertain.[10] This foretells concerns raised about PND progressing towards eugenics, an argument often dismissed as the 'slippery slope'. The French obstetricians and midwives commented, "The societal and medical values are eugenic, there is more and more eugenic thinking".[10] This highlights the importance of 'drawing lines in the sand' of what exactly constitutes a 'sufficiently serious' medical condition for PND and possible genetic termination, and yet there appears to be no easy way of achieving consensus on this issue among healthcare professionals, policy makers or the disabled community itself.[10,5]

There is, to be sure, variation and ambivalence of opinion on PND amongst the disabled community and those who have had intimate experience with disabled individuals. For example, while many disability rights critics of PND may suggest that the decision to terminate is based on inaccurate perceptions or a lack of accurate information about what life is really like with a disability, a qualitative study amongst women carriers of X-linked conditions portrayed a different trend. The women who had grown up with close relatives (i.e. brothers) affected with Duchenne's Muscular Dystrophy (DMD) and had first-hand experience of what life is like with the condition were more certain and unequivocal about their decision to terminate if PND indicated such a condition for their fetus than those women who had not had such intimate personal exposure to DMD. The latter women were less certain and at least initially more ambivalent when considering the decision to terminate.[11] Furthermore, some of the women 'without personal experience' admitted they purposefully avoided finding out too much information about the condition they carried for fear of putting them off having children altogether,[11] thus indicating that more information is not always desired. In another study, when asked about their views on PND and choices, the majority of HD and CF patients indicated that PND and the option of termination was a positive advantage. One CF respondent went so far as to indicate that she would personally elect to terminate her child if she knew it had CF or any other illnesses, "Because...I know what it's like. There's no way I would bring a baby in this world".[8]

So what should healthcare professionals do to address these concerns? Perhaps the answer does not lie in eliminating PND but by making its practice more sensitive and responsive to the objections raised. Perhaps most important, in accordance with the ethic of genetic counseling, is that all genetics professionals must help prospective parents give truly informed consent to receive testing and equally must help patients reach truly informed decisions about using test results. The first of these is by giving providers access to good, usable information about what disability is really like for children with disabilities and for their families. Education about life with disability - as it is viewed by people who live with disabilities - is still too rarely offered to those who deliver genetic information. Disability must become an important topic in the

training of anyone who offers prenatal genetic tests, and should ideally be integrated into care before a prenatal screening test, prior to amniocentesis, and post-delivery of test results. If and when clients indicate that they want information about disability, it should be given—but what kind of information do they need? According to the Down Syndrome Congress, prospective parents who learn that their fetus has a disabling trait need to receive: "a) information that seeks to dispel common misconceptions about disability and present disability from the perspective of a person with a disability; b) information on community based services for children with disabilities and their families as well as on financial assistance programs; c) materials on special needs adoption; and d) a summary of major laws protecting the civil rights of persons with disabilities. People with disabilities and parents of people with disabilities should be available to talk with future parents".[5]

There are PND programs that help prospective parents gather information about what life is like for families with children who have disabilities. Yet some evidence suggests that there are still physicians and genetic counselors who, for example, display surprise or distress upon hearing that a woman wants to bring to term a fetus identified as having a disability. This highlights the importance of starting education "at home": if health professionals are to help individuals make truly informed decision, then they, like everybody else in the "majority" community, must identify and overcome biases against people with disabilities.[5] Rather than focusing on what is wrong with a disabled individual and what disability prevents an individual from doing, as the medical model often leads us to do, we need to focus on what the individual can do and on finding alternative ways for the individual to enjoy the same types of life experiences (if modified) that the "majority" do.

If healthcare professionals truly wish to offer and support the widest possible range of reproductive options for their clients, then they also have a responsibility to advocate for and to help create a society where all individuals, able or 'disabled', are accommodated and welcomed. As healthcare professionals often have first-hand contact with disabled individuals and their families as well as access to resources, they are well placed to be advocates for their clients on the individual level. On a population level, they are also well positioned to be the watchdog and vocal advocate to ensure that social, financial, educational, medical and political resources for the disabled community certainly do not erode and continue to improve in quantity and quality. This includes ensuring that research on successful prevention, treatment and management of various genetic conditions continues apace and remains a high priority, despite the conceivably easier path of simple eradication through PND.

But provision of resources is not enough. We must work to change attitudes. For example, over the last three decades, tremendous progress has been made in the medical and surgical treatment of DS infants. Nationally in the US, a great deal of resources are allocated to DS infants to improve their growth and development.[12] Yet the perception remains that the DS infant is still not openly accepted by parents and society, as illustrated by case reviews of parents receiving their DS infant in hospital.[12] It can be argued that health professionals have the responsibility to help make public attitudes more accepting of Down Syndrome. Professionals should encourage social and community involvement of these children. National advocacy and service groups should be contacted periodically to promote activities to enhance public awareness.

Though PND and PGD may be here to stay as the "standard of care", the ethical issues they pose, particularly from the disability rights standpoint, are far from resolved and cannot be dismissed. Rather, we need to listen to the concerns raised in ethical debate and be responsive to them so as to make PND and PGD as sensitive to all parties and ethically sound as possible. Now more then ever it is essential that we not become complacent about how we treat disabled members of our community. How we treat them is indeed a measure of the quality of our society and how we are willing to treat ourselves.

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Diagnostic Review

Ultrasound's Role in Obstetrics and Gynecology: Fetal Assessment and Pelvic Bleeding

Nooreen Popat, Meds 2008, Janet Malowany, Meds 2008, and Jeremy Keller, Meds 2007

Ultrasound imaging is a useful and practical screening and diagnostic tool in many areas of medicine. The diverse field of obstetrics and gynecology makes use of this tool in many clinical scenarios. Two will be discussed in the following article. The use of ultrasound in pregnancy provides substantial information concerning fetal life and development. It is used at various stages of gestation to provide information about fetal growth and health. It also functions as a screening tool for congenital anomalies in fetal development. Another role of ultrasound is in the assessment of pelvic bleeding. It is used as an initial screening tool to provide information about endometrial wall thickness, presence of polyps and other anatomical abnormalities. It assists in clinical decision making with respect to planning further diagnostic tests and future follow-up. Ultrasound is a highly utilized and very effective method of assessment in the field of obstetrics and gynecology.

Ultrasound is a useful and important diagnostic tool in many fields of medicine. It has a great clinical utility and its impact on the practice of obstetrics and gynecology has been tremendous. It is a non-invasive and non-radioactive method of assessing and examining anatomy, pathology, progression of disease and fetal development. Since ultrasound is a non-radioactive imaging modality, it is of particular utility in the practice of obstetrics and gynecology. Radiation exposure in pregnancy must be avoided, so other imaging techniques such as X-ray and CT cannot be used. This aricle provides a brief overview of two of the common uses of ultrasound: prenatal assessment of fetal development and pelvic bleeding.

An assessment of fetal life and pregnancy is crucial to good outcomes for both the mother and the baby. Ultrasound allows for regular and safe assessment of many important factors that contribute to a healthy pregnancy and delivery. These include congenital anomalies, assessment of multiple gestations and assessing gestational age as well as overall health of the fetus.

In contrast, the evaluation of pelvic bleeding must be initiated quickly and assessed adequately. Ultrasound is a useful screening tool to differentiate between benign and malignant causes as well as guiding further diagnostic tests.

Ultrasound has an immense role in assessment and diagnosis in the field of obstetrics and gynecology and the following discussion offers only a segment of its broad applications.

PRENATAL ULTRASOUND

Although routine ultrasound is recommended for all pregnant women in their second trimester[1], its judicious use remains controversial[2,3]. Many early trials provided conflicting results about its usefulness for pregnant women[4-6], raising questions about its optimal timing as a screening or diagnostic tool. The value of ultrasound has revolutionized obstetrical care due to its ability to visualize the developing fetus throughout the pregnancy.

The components of a basic ultrasound examination differ according to the trimester of the pregnancy. In the first trimester, the main goals are to confirm the presence of an intrauterine pregnancy and the location of the gestational sac; to identify fetal viability through cardiac function; to determine the presence of a multiple gestation and its chorionicity/amnionicity; to assess gestational age through crown-rump length; and to evaluate maternal pelvic organs for abnormalities including the uterus, adnexal structures and cul-de-sac[7]. For ultrasonic examinations in the second and third trimesters, one is able to survey fetal anatomy more comprehensively. A basic ultrasound examination would include determining the fetal number, fetal presentation, documentation of fetal cardiac activity including heart rate, placental location, amniotic fluid volume, assessment of gestational age and weight through fetal biometry, fetal anatomical survey and an evaluation of maternal pelvic organs including the cervix and lower uterine segment[7].

Accurate gestation dating has been a major benefit for early ultrasound investigations. Assessed during the first 8-12 weeks, the crown-rump length is the most accurate method to date gestational age throughout pregnancy, correctly determining the expected date of delivery within 5 days[8]. Between 14 and 26 weeks, the gestational age may be approximated by combining the biparietal diameter, head circumference, abdominal circumference, and femur length, each of which has a variation between 7-10 days in the second trimester[9, 10]. Although more accurate in the first trimester, there is no clinically significant difference of gestational dating during the first two trimesters, but it is more variable during the third trimester11. With more accurate gestational dating, there is a reduction in misdiagnoses of intrauterine growth restriction[12], in the use of tocolysis for inhibiting preterm labour[13], and in post-term labour inductions[14, 15].

The earlier identification of multiple births has also contributed to better perinatal outcomes, and routine ultrasound is better able to diagnose twin pregnancies[5, 15].

The prenatal detection of congenital anomalies has been a controversial benefit of ultrasonic examinations. One can identify a spectrum of anomalies detectable throughout different trimesters, with central nervous system abnormalities being the easiest to detect in earlier assessments. Genetic abnormalities such as aneuploidy can also be easily detected early in pregnancy. Coupled with maternal serum screening, over 90% of trisomies 18 and 21 can be detected in the first trimester[16]. The Helsinki trial demonstrated a significant increased detection of fetal anomalies upon introduction of routine ultrasounds, and the significant reduction of the perinatal mortality rate was attributed primarily to the increase in elective terminations but also to the increased detection of multiple births[5]. The Eurofetus study also demonstrated increased detection of fetal anomalies through routine screening, primarily of central nervous system, urinary tract or musculoskeletal origin[4]. The RADIUS trial also discovered increased fetal anomalies upon routine screening but it did not uncover any improvements for perinatal outcomes such as mortality, preterm birth, birth weight and neonatal morbidity[6]. These discrepancies have been attributed to the strict inclusion criteria for low-risk pregnancies and the lower rate of elective terminations[3]. Yet, evidence also suggests that even without an increase in abortions, increased detection of fetal anomalies result in better neonatal outcomes[17].

Because 75-90% of fetal anomalies occur in women considered to be low-risk, advantages of routine ultrasound include accurate gestational age, decreased labour inductions, early identification of multiple gestations, the detection of anatomical fetal malformations and fetal growth restriction and overall improved perinatal mortality rates[15, 19]. This is the basis for the recommendation of routine ultrasounds for Canadian women in their second trimester[1], with the optimal time between 16-20 weeks allowing for a more complete anatomical assessment[7]. The Society of Obstetricians and Gynaecologists of Canada does not recommend routine ultrasonic screening prior to 14 weeks unless patients present with specific clinical indications (Table 1)[20]. The American College of Obstetricians and Gynecologists does not mandate any routine ultrasound screenings, particularly if the patient is at low risk with no other indications for sonography, leaving the decision to both the physician and the patient[7].

Table 1: Recommended guidelines for first trimester ultrasounds by the SOGC[20]

1. For assessment of threatened abortion to document fetal viability or for incomplete abortion to identify retained products of conception.
2. For assessment of gestational age when last menstrual period date is uncertain. First trimester ultrasound is not recommended to diagnose pregnancy, to date pregnancy when last normal menstrual period and physical examination are concordant, or to investigate an inevitable abortion.
3. Prior to pregnancy termination.
4. During diagnostic or therapeutic procedures requiring visual guidance (e.g., chorionic villus sampling, amniocentesis) and prior to cervical cerclage placement.
5. For suspected multiple gestation to allow for reliable determination of chorionicity or amnionicity.
6. For suspected ectopic pregnancy, molar pregnancy, and suspected pelvic masses.
7. For early assessment of anatomic development in situations of increased risk for major fetal congenital malformations.
8. For nuchal translucency screening when offered as part of a comprehensive prenatal screening and counselling program by experienced operators with appropriate quality assurance processes in place.

ULTRASOUND FOR PELVIC BLEEDING

Ultrasound is not just a useful tool to screen for pelvic, uterine and fetal abnormalities; it is also helpful in discriminating between differential diagnoses for pelvic bleeding. Clinically, pelvic bleeding is a more common problem in postmenopausal women than during any other stage of female reproduction[21]. Postmenopausal pelvic bleeding can be due to one of two broad categories of causes: benign and malignant. Pelvic bleeding is due to endometrial carcinoma in 10-20% of cases and to benign causes like endometrial atrophy, polyps, and hyperplasia in the remaining 80-90% of cases[22].

In cases of pelvic bleeding, transvaginal ultrasound is frequently used as the initial exploratory tool to reliably examine both the thickness and the echostructure of the endometrium. This initial exploration will help determine if further investigation, such as endometrial biopsy or dilatation and curettage (D&C), is required. In addition to simple transvaginal ultrasound, saline infusion sonohysterography (SIS) can also be used. SIS involves the use of transvaginal ultrasound while the uterus is expanded via insertion of small quantity of saline through a catheter. SIS enhances endometrial imaging by using saline as a contrast medium, and it has a higher sensitivity than transvaginal ultrasound alone[23]. SIS is different from simple transvaginal ultrasound in that it can help to distinguish between growing endometrial lesions, such as hyperplasia, and lesions that are stable, such as polyps. Like simple transvaginal ultrasound, however, SIS cannot definitively distinguish between benign and malignant lesions[24].

With respect to transvaginal ultrasound examination of endometrial thickness, any observed thickening or intraluminal masses are suggestive of hyperplasia. An endometrial thickness of 4 mm or less likely indicates benign causes of post menopausal pelvic bleeding such as endometrial atrophy, and so no further

testing is done[25]. Studies have shown that this is a reliable cut-off value with a false-negative rate as low as endometrial biopsy or D&C[21]. An endometrial thickness of greater than 4 mm is associated with causes such as polyps, benign hyperplasia, and carcinoma, with the probability of carcinoma increasing with greater thickness. If the endometrium is thicker than 4 mm, or if it cannot be observed accurately, then SIS is used as the next exploratory tool, possibly followed by endometrial biopsy or D&C. If polypoid lesions or focal thickenings are observed, then histological assessment of these tissues by endometrial biopsy is the next step. The combined use of transvaginal ultrasound with the 4 mm cut-off as the first step to assess pelvic bleeding is fiscally responsible for two reasons: firstly, it decreases the total number of endometrial biopsies performed; secondly, it is less costly than performing an endometrial biopsy as the first step[26].

Concurrent examination of the echo structure of the thickened endometrium or uterine mass may help to distinguish benign from malignant hyperplasia. More specifically, homogeneous thickening suggests benign hyperplasia, whereas heterogeneous thickening may be indicative of malignancy. Since there is no clear distinction between these two categories of thickening, cases where endometrial thickening or intraluminal masses are observed require further histological investigation, by either endometrial biopsy or D&C, in order for a definitive diagnosis to be made[27].

Simple transvaginal ultrasound and SIS are two useful tools in the assessment of postmenopausal pelvic bleeding. These tools can help to diagnose certain benign causes of pelvic bleeding, such as post menopausal endometrial atrophy. In addition, they can provide clear indications for more invasive assessment, such as endometrial biopsy or D&C, in cases where focal or diffuse thickenings, or polypoid lesions, are observed. Lastly, they can be performed at relatively low cost, compared to endometrial biopsy and D&C, making their use as initial exploratory tools economically conscientious.

CONCLUSION

Ultrasound is a commonly used tool in the clinical practice of obstetrics and gynecology. It is a quick, inexpensive, non-radioactive imaging method of assessing anatomy, pathology and fetal growth. Its application in pregnancy and fetal assessment as well as pelvic bleeding illustrates its diverse function and applicability in the clinical setting. Ultrasound continues to be an effective imaging technique in many fields of medicine and as the technology progresses indications for its use will continue to grow.

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Profiles

A Conversation with Dr. Paul Bernstein, Obstetrician/Gynecologist

Betty Lee, B.Sc., Medicine 2006

Practicing as an obstetrician/gynecologist for over 25 years, Dr. Bernstein is an excellent role model for aspiring physicians. Upon graduating from the University of Toronto's undergraduate medical program, Dr. Bernstein first decided on a career in family medicine. However, after working for 2 years as a family physician, he discovered that his true passion was obstetrics and chose to pursue an Obstetrics and Gynecology residency at the University of Toronto. In addition to being an accomplished clinician, Dr. Bernstein is also a well-respected teacher.

Dr. Bernstein currently practices at Mount Sinai Hospital, one of the premier teaching facilities in Toronto. For seven years he also served as Residency Program Director for the University of Toronto Obstetrics and Gynecology program. Dr. Bernstein continues to further the education of both medical students and residents in his role as an Associate Professor at the University of Toronto's Faculty of Medicine.

Why did you choose to specialize in obstetrics and gynecology?

I think it was the fascination with it all. For me, I liked the whole idea of obstetrics and looking after women who were having babies. I had actually done family medicine for two years first, and in those days it was a little easier to switch fields, because we had the option of starting off in family medicine and then applying and specializing in a specific field later on. I had always thought about practicing in obstetrics. When I was a family doctor, I enjoyed everything, but obstetrics was the favourite part of my practice so I could tell that I wanted to specialize in it. I could tell that it was a career that I could do for a long time because there are so many interesting facets involved and I liked the lifestyle. I enjoy being busy and having to juggle many tasks. Though these days, there are subspecialties in obstetrics and gynecology where you can have more structure and definitely the lifestyle is much more structured now than it used to be.

Are you finding that the variety of subspecialties in obstetrics/gynecology is expanding?

Yes, I think so. Currently there is a significant market for the subspecialties in obstetrics and gynecology. There is definitely the opportunity to become an 'expert's expert' with the volume of new information both in clinical practice and theoretical science.

When does one choose to sub-specialize and what is the process for doing so?

At this point there is no streaming in the obstetrics/gynecology residency program. However this is an issue that is discussed on a regular basis because of the thought that streaming could eliminate some of the residency that may not be utilized afterwards in practice. For example, if you decide that you would like to focus on gynecological pelvic surgery and not on obstetrics, one could potentially decide to structure their residency to suit that and focus more of their training time on surgery and less in obstetrics. Streaming is an idea that is being thought about, but at this point, what happens is, in our program at Toronto, there is elective time. So for instance, if someone would like to be a surgical oncologist in obs/gyn, there is a chance for that person to do an elective with someone in the field and get a better idea of that subspecialty. There are some individuals who come into the residency knowing exactly what they want do, so we try to help them expedite that, and expose them to the specific field that they are interested in. Doing research and having experience in the subspecialty of your choice is beneficial when applying for fellowships.

As the former U of T Residency Program Director, what attributes did you look for in potential residents?

Well, when I was the Residency Director, I always felt that it

was very important to interview people and give everybody a fair chance to show their stuff. We rarely turned anybody away for an interview because we thought that that was unfair. We try to be fair. We evaluate everybody's file, their letters of reference, their interview and people's general impressions. Then we give them a score and rank the people that we really want. The interview is important and most of the students interview extremely well, because the students are bright and know how to interview. The interview is structured, we try to make it fair, and score it in an objective manner. In that way, even if different people are leading the interviews, the students will get similar interviews. We want somebody who we think is well rounded and we want people who have shown an interest, at some point, in the specialty. Basically, those are the criteria that we look for.

Is it important to do an elective at the facility that you want to have your residency in?

Well I don't think that it is the deciding factor, but I guess it helps if people have seen you work. You can't beat working in the field with somebody and seeing how they apply themselves. We think that it is very important, in the way the residency is set up, for people to be good team players. During residency, you really depend on each other. It certainly doesn't hurt to do an elective there, and it might even help. Of course, it is impossible to do an elective everywhere, and with our program, we have had people from across the country. So I don't think it really matters.

How do you determine what percentage of your practice is obstetrics versus gynecology?

Well you can choose how you structure your practice. For instance, I know some clinicians that don't practice any obstetrics; their focus is mainly on gynecology. There are others who do prenatal care and not deliveries. Some doctors have a higher weight in their obstetrical portion and do not perform much operative gynecology but rather general gynecology. Oftentimes, obstetrical patients whom you treat prefer to have you follow them as their gynecologist. You can definitely profile your practice however you choose to suit your interests.

Can you describe what your typical work week is like?

In my typical week, I have about 5 or 6 half days in my office and I work one night on call. I spend one half day covering the labour floor. The rest of the week, I have time to do some surgery like C-sections, and catch up on my paperwork. I like to start my days early. I make my rounds at 7:00 or 7:30 a.m. and then I go into the office. I structure my lifestyle so that I don't have to work late. My day is usually done by 3:30 - 4:00 p.m.

I also like working in a teaching facility. The benefits are that you have a lot of support. Many of my colleagues are sub-specialists so they are available for consulting, and residents are always helpful in managing your patients.

How has the specialty changed throughout your career?

The lifestyle is definitely not like it was in the old days. I think that these days, you can have your schedule be whatever you want it to be. There's group coverage and in our institute, we have a call system so people are free if they do not want to come in and do deliveries a certain night. The system works. Even if you choose to work nights, you can structure your nights and determine your own schedule.

In terms of the practice of obs/gyn, we have more technology. Now there is fetal monitoring and screening tests have changed. Gynecological surgeries are more minimally invasive.

How do you see the field of obstetrics and gynecology evolving in the future?

I personally think that it will evolve into more sub-specialization, perhaps into surgical and non-surgical aspects. I think that with the issue of streaming, it behooves us to investigate it in more detail. As the body of knowledge increases, the residents will be responsible for learning far more techniques and information than in the past. It would be practical to have streaming, as that would provide focus and improve resources for new clinicians.

What's the favourite part of your career?

I enjoy interacting with the patients. I don't think that I could have ever done anything that did not involve any patient care. I like following my patients and seeing how they progress from day to day. I have patients that I've followed for a long time. I see them before they have their kids, I take care of them when they have their kids, and I see their kids grow up. It's good!

The interesting thing is that when I get up in the morning, I don't know what's going to happen to me that day! It's so exciting, it's a great mix and you get to do something that makes a big difference!

The Pap Smear

Christopher Gillis, Meds 2008

The Pap smear is a screening test for cervical dysplasia, which is an early finding of possible cervical cancer. The Pap smear procedure is named for Dr. George Papanicolaou (1883-1962) a physician from Greece. Dr. Papanicolaou first published his paper in 1943, along with gynecologist Dr. Herbert F. Traut, showing that cellular abnormalities could be detected by vaginal smear before a possible malignancy became invasive. The "Pap smear" quickly became a routine screening technique and physicians were encouraged to include it during routine visits for contraceptive visits.[1]

Human Papillomavirus (HPV) is recognized as the etiological agent for the development of cervical dysplasias, especially subtypes 16 and 18.[2] After puberty and before the age of 30, sexually active women have a higher chance of acquiring new HPV infection.[1] If not eliminated by the immune system, the virus can cause dysplasia of the cervical transformation zone. In this region of the cervix, columnar cells are actively participating in squamous cell metaplasia. It is persistent HPV infection that can cause progression to high grade dysplasia and cancer.[1,2] After age 30, detected HPV infection is most likely to be the result of a persistent infection and is therefore more likely to progress.[1]

The pap smear is collected using a wooden spatula and a cytobrush. The collected specimen is then applied and fixed to a glass slide.[3] The new standard for Pap smears involves the use of liquid-based specimen storage. The smear is performed by sampling the exocervix and the endocervical canal at the transformation zone. The spatula and cytobrush are used in combination to sample the entire area of the transformation zone. The sample is then smeared onto a slide and then immediately fixed with a cytological fixative in preparation for examination by a pathologist. The focus of the technique is both to eliminate sampling error by ensuring the entire transformation zone is sampled and to eliminate a drying artifact on the slides. The liquid based procedures are considered to be more effective by reducing the incidence of inadequate smears. The cells are collected in the same way as the conventional Pap smear, but the sampling device is placed in liquid medium for the purpose of transport to the laboratory. This newer liquid technique allows the cells to be plated more evenly upon the slide for review. Its other benefits include a reduction in cellular distortion, decreased debris on the slide and decreased contamination by red blood cells on the slide. One of the liquid based procedures is called the the ThinPrep Pap smear. Results of a study based on a comparison of the ThinPrep Pap smear and the conventional Pap smear shows an increased detection of low level cervical dysplasia (L-SIL) of 9.4% as compared to only 8% with the conventional Pap smear.[4,5]

The current recommendation is that women should have their first Pap test about 3 years after the onset of intercourse, or by the age of 21.[1] The Pap smear screening should continue every year for sexually active women until there have been 3 negative Pap smear results, then the testing can be performed only every 2 or 3 years at the discretion of the physician.[1,4] The recommendations for treatment and follow-up following abnormal Pap smear results are based on the Bethesda system outlined at the 2001 American Society for Colposcopy and Cervical Pathology Consensus Conference.6

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Telemedicine in Ontario

Deric Morrison, Meds 2005

Although Canada has one of the finest health care systems in the world, with state of the art medical equipment, training, and care, being the second largest country in the world it is often difficult to have these services delivered to all the inhabitants of our nation. It is especially difficult for residents of rural areas to obtain access to the medical care that is characteristically delivered in larger urban centers. A recent strategy for delivering the advantages of large center, high technology health care to rural areas is the use of telemedicine. Specifically, the NORTH Network and the telestroke Ontario programs have recently been implemented to provide previously unavailable services to rural areas. This article examines the possible advantages telemedicine may provide rural communities, and explains how the NORTH Network and telestroke Ontario may be used to improve rural health care.

The health care provided in Canada is among the best in the world. We are fortunate in this country to have access to exciting new medical technology, excellent medical training centers and medical personnel who are held to the highest of standards. However, being the second largest country in the world provides challenges, in that much of Canada's land is composed of rural area. While it is true that the majority of Canadians live in, or very near, urban centers that offer a full complement of medical services, a significant proportion (~31%) live in rural and remote locations that render it difficult to obtain timely medical care. This problem is compounded by the lack of specialized care in rural centers that may have access to hospitals and physicians but do not always have the resources or personnel to perform necessary specialized medical treatment. In recognition of these challenges to our health care system, advances have been made in the field of telemedicine to ensure that all residents of Canada have timely access to the care that they require. Telemedicine has been defined as the use of information and communications technology to provide health care services to individuals who are some distance from the health care provider.[1] Telemedicine can include teleradiology, telepsychiatry, telesurgery, transmission of echocardiographic or obstetrical ultrasound images, the telehealth Ontario program, or electronic referrals and consultations. These programs are ideal for a country such as Canada that has access to excellent health care but faces geographical limitations in delivering this care to all of its residents.

One of the most ambitious telemedicine endeavours in this country has been the use of the NORTH Network telemedicine program in Ontario. This program began as a feasibility study in 1995 of how telemedicine might be able to improve health care in northern Ontario. The NORTH Network began in earnest in 1998 and since then has expanded to a 64-site network. The NORTH Network allows members of rural northern Ontario communities to experience consultations with medical specialists via telemedicine. There are more than thirty medical specialties available to users of the NORTH Network, including medical and surgical specialties and sub-specialties, anaesthesia, radiology, psychiatry, obstetrics, dermatology, paediatrics, physiotherapy and speech therapy. The technology that makes telemedicine consultations through the NORTH Network possible is available at 59 sites in rural northern Ontario; these sites can then be linked to centres offering specialized care such as Winnipeg, Thunder Bay, Sudbury, North Bay, Timmins and Sault Ste. Marie. Also, when necessary, consultations can be made through the NORTH Network to academic hospitals in southern Ontario. The technology used by the NORTH Network is simply operated and consists of video screens with input from remote cameras and microphones, which can be operated by a touch pad. Several medical devices can also be attached to the unit when needed; for example, an otoscope may be connected to examine a patient's ear

remotely. Also, radiology films and other images may be scanned and transmitted through the unit. Over the past few years, the NORTH Network has provided residents of rural northern Ontario a valuable option in receiving medical care. Instead of being required to travel long distances to see specialists - a situation that results in high cost to the individual as well as the health care system, delays before adequate treatment can be arranged, and possibly even a complete lack of access to some services - it is now possible for these individuals to see specialists located hundreds of kilometres away from the proximity of their home community.[2] More research needs to be performed to determine the benefit of these telemedicine services, but it seems reasonable that an efficiently run rural telemedicine program should provide many advantages to health care in much of rural Canada.

Another example of how telemedicine can be used to improve patient care is the recently developed telestroke program in Ontario. In recent years, the treatment of acute thromboembolic stroke has improved dramatically with the use of thrombolytic therapy such as t-PA.[3] However, there are concerns regarding this treatment, namely that not all patients who have experienced a cerebrovascular event qualify for thrombolytic therapy. Only those who have suffered from a thromboembolic stroke would benefit, whereas those who have had an intracranial haemorrhage would likely have their condition worsened by thrombolytic therapy. Also, patients who have not experienced intracranial haemorrhage but are at higher risk of bleeding intracranially, such as those with recent major surgery, bleeding diathesis, and significant comorbidity must be excluded from thrombolytic therapy.[3,4,5] Another major obstacle in providing patients who have had acute thromboembolic stroke with thrombolytic treatment is the short amount of time in which treatment may be administered. This makes administering thrombolytic treatment to acute stroke patients in small centres almost impossible without access to a neurologist to confirm the appropriateness of thrombolytic therapy. To this end, the telestroke program has been implemented in Ontario.

The telestroke program is an initiative that gives emergency room physicians in North Bay and Sudbury hospitals 24-hour, seven–day-a-week access to links with stroke neurologists at Toronto's Sunnybrook and Women's College Health Sciences Centre and the University Health Network. The program allows the neurologist to evaluate the CT image, the neurological assessment and the history provided by the referring physician and to determine the appropriateness of thrombolytic therapy. Telestroke gives a significant population of patients in rural northeastern Ontario access to specialized services and proven effective therapy for acute thromboembolic stroke that would otherwise be completely unattainable. It is to be hoped that in the future this service can be expanded to provide access to the best medical treatments for thromboembolic stroke to all residents of rural Ontario.[6]

Emerging technologies in telemedicine are an important aspect of the future of the health care system in Canada. Novel approaches to the challenges of the large geography and dispersed population of our country are necessary to ensure that all members of this nation receive access to the best health care available. It is to be hoped that telemedicine programs such as the NORTH Network and Telestroke can aid in making this goal a reality.

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Thinking on Your Feet

An Approach to Postpartum Hemorrhage

Jay Banerjee, Meds 2005 and Sujiva Heyn, Meds 2006

Case: Ms. Jones is a 30 year-old female journalist, $G_3T_2P_0A_0L_2$ who presents to the emergency department in her 40th week of pregnancy in active labour. In her previous pregnancy, she sustained significant blood loss secondary to uterine atony and is worried about recurrence of this problem. Her current pregnancy has been uncomplicated, and she has experienced no blood loss, except for some minor spotting in her first trimester. She asks for your advice (as a clinical clerk) as to what will be done if she begins to hemorrhage?

As a clinical clerk, the experience of witnessing an obstetrical hemorrhage can be a nerve-wracking one. Postpartum hemorrhage is among the top five causes of maternal death worldwide and a major cause of maternal morbidity.[1] In the developing world, the maternal death risk is one in 1000 deliveries;[2] in the developed world maternal morbidity is usually a result of significant blood loss.

Postpartum hemorrhage (PPH) is classically defined as blood loss exceeding 500mL before completion of the third stage of labour.[3] Signs and symptoms of hypovolemia may include fainting, lethargy, tachycardia, hypotension, pallor, and diaphoresis. However, since a healthy pregnant woman can tolerate up to 1000mL of acute blood loss without significant hemodynamic disturbances, clinical determination of blood loss is often underestimated.[4] It has been suggested that a more clinically relevant definition would be a drop in hematocrit of 10% or a hemorrhage requiring immediate transfusion.[5] However, acute hemorrhage is not reflected in hemotocrit for at least 4 hours, and full equilibration may take 24 to 48 hours.[6] Complications from such an event include hypovolemic shock, renal failure, hepatic failure, adult respiratory distress syndrome, and disseminated intravascular coagulopathy.[7] In patients with a history of PPH, the recurrence risk is between 20-25%.[8]

As a clinical clerk, one is often asked to take a complete history upon admission. A thorough obstetrical assessment should include inquiry into the various risk factors for hemorrhage. These include nulliparity, obesity, large size (for gestational age), history of prolonged third stage, antepartum hemorrhage, previous postpartum hemorrhage, and operative deliveries. The major causes of PPH include uterine atony, retained placental fragments, placental adhesions, lower genital tract lacerations, uterine rupture, uterine inversion, and coagulopathies.[9] If one is doing an obstetrical rotation in a developing country, it is important to be aware of the contributory factors to PPH. These include low socioeconomic status, anemia, infrequent prenatal checkups, and limited access to hospital staff and emergency resuscitative resources.[10,11] However, it appears that multi-parity does not increase the likelihood of hemorrhage.[12]

MANAGEMENT

As a clerk, the first step in the management of PPH is immediate resuscitation, identification of the likely source, and arrest of bleeding. Resuscitative efforts with the aid of senior staff should be initiated, including monitoring vitals (heart rate, respiratory rate, blood pressure, oxygen saturation), establishing two intravenous access sites, volume replacement (Ringer's lactate, Hartman's solution, or 0.9% saline), elevating the legs, cross matching 6 units of blood, full blood count, clotting screen, baseline urea and electrolytes, and monitoring urine output. Evidence of hypovolemia is monitored with vitals and treated with crystalloid and blood products as required. Supplemental oxygen should also be given to increase oxygen delivery to microvasculature.

Bleeding that begins before placental delivery is often due to a laceration or coagulopathy, whereas bleeding that occurs after placental delivery suggests uterine atony, inversion, or retained placental fragments.[13]

During the clinical clerkship year, one plays a large role after the baby is delivered – a role not to be underestimated. Active management of the third stage of labour is recommended for high-risk cases and is associated with reduced blood loss and a reduction in PPH of more than 40%.[14] The principals governing active management include early cord clamping, prophylactic uterotonic drugs before placental delivery, and ensuring complete extraction of the placenta. If a patient begins to bleed despite these steps, more invasive techniques are utilized.

Active management includes bimanual compression, examination and evacuation of the placenta for retained products, and repair of any tears. Studies indicate that prostaglandins, which are endogenous uterotonic agents that help myometrial contractility, are released as a result of intrauterine pressure, myometrial stretching, or manipulation.[15] In addition, exogenous uterotonics, such as oxytocin, ergometrine, and 15-methyl prostaglandin F_2(PG-F_2) can be utilized. However, there is an advantage of using PG-F_2 due to its rapid onset of action and ease of administration. Ergometrine (0.25-0.5mg IM) and oxytocin require protection from light, refrigeration, and sterile administration.[16] In addition, ergometrine cannot be given to hypertensive women. A recent World Health Organization study suggests the use of oxytocin (10 IU IV/IM) as a first-line agent; however, misoprostol (600ug oral) has also been shown to be as effective as oxytocin alone and a more practical option, particularly in rural settings.[17,18]

For those failing active management, uterine packing with gauze remains the standard of care. The Sengstaken-Blakemore catheter has recently emerged as a diagnostic and therapeutic tool via the "tamponade test". The catheter is inserted into the uterine cavity and inflated with normal saline to create a tamponade to identify women who will respond to this intervention; those who do not are prepared for laparotomy.[19] Other options available include a Foley catheter to achieve the tamponade effect; however, its limitations include reduced level of inflation. In developing countries, with limited resources, a hydrostatic condom catheter is often used to control PPH quickly and effectively.[20]

In the past, as a last resort, the surgical standard of care for patients was a hysterectomy and ligation of internal iliac arteries.[21] Today, less invasive procedures are used. These include the B-Lynch stitch and multiple square sutures.[22] With the advent of improved radiological techniques, selective arterial embolization will be an option that offers minimal complication rates and preservation of fertility.[23]

In summary, when on the ward it is important to identify the risk factors for PPH when obtaining the history, and to be able to recognize the early signs of shock. Appropriate knowledge of medical and surgical treatment modalities and the ability to counsel patients effectively is important in managing obstetric patients. In the case presented, given the patient's history, there is a high recurrence risk of hemorrhage. As a clerk, a complete history and close monitoring of the patient's progression through the labour and delivery stages are warranted, as well as active medical management of the third stage with a uterotonic agent. If possible, delivery in a tertiary care centre is suggested where the appropriate medical resources and support services will be available to manage this case effectively. A well-thought out approach to obstetric hemorrhage will enable one to deal with patients in a calm and rational manner.

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Joint Replacement: Past, Present, and Future

Sujiva Heyn, Meds 2006 and Jay Banerjee, Meds 2005

Case: Mrs. Joint is a 55 year-old with gradual onset of a chronic, continuous, progressive non-inflammatory polyarthritis, asymmetrically involving the joints of the hands, left knee, and hip, associated with a strong family history of osteoarthritis. She is stiff every morning for about 20 minutes, but generally worsens through the day and with activity. She is sometimes stiff for 1 or 2 steps after prolonged sitting. She complains of some pain, swelling and some loss of range of motion. On clinical exam her joints are warm, but non-erythematous. She is otherwise healthy, but is worried about needing hip replacement in the near future.

Joint replacement is one of the most commonly performed procedures in the developed world. Total hip or knee replacement is usually related to osteoarthritis or some type of arthritic condition. Dr. Bourne, an orthopedic surgeon at the London Health Sciences Centre, reports that in Canada there are 43,000 hip and knee replacements yearly, with a 47% increase in replacements over the last five years. This figure is expected to double by 2020.[1] Hence, the clinical importance of hip replacement lies in the significant medical and social implications associated with the procedure.

While joint replacement, such as hip arthroplasty, is an effective intervention strategy, the ballooning cost places a huge strain on the medical system. Population projections for 2041 indicate 25% of the population will be over the age of 65 years of age, and it is anticipated that the demands will surpass the supply of resources for joint replacement.[2] Hence, there is a pressing need to address the significant medical and social implications associated with this procedure which will continue to be a growing health concern among Canadians.

PAST AND PRESENT

The first breakthrough in this field was contributed by Sir John Charnley, who developed the low friction arthoplasty in the early 1960s.[3] He experimented with stainless steel on Teflon, and later with high density polyethylene. Over the years, bearing surfaces have improved significantly. Currently, a high molecular weight medical grade polyethylene is used. More recently it has been discovered that if you can irradiate the polyethylene in an oxygen free environment you can get cross linking and it will reduce the wear by about 90%. Cross-linked polyethylene has resulted in increased tensile strength and longevity of parts, thereby reducing the need for revision total hip arthroplasty.[4]

CANADIAN SITUATION

In Canada, the incident requirement rate of 2.23 total hip replacments per 1000 people. In 1996, the number of surgeries provided fell short by the 43%, while the cumulative backlog of people requiring surgery was about 80 000.[5] At London Health Sciences Centre, the average waiting time from initial family physician consult to surgery is approximately 24 months.[6] The significant gap between health services required and provision of these services demonstrates a significant inadequacy in the delivery of health care in Canada.

The creation of the Ontario Joint Replacement Registry provides a means to improve the delivery of joint replacements in the province.[7] In this era of evidence-based medicine, the registry will provide a tool to monitor replacements parts, assess the effectiveness of surgical procedures, and to understand patient demographics and profiles. The Western Ontario and McMaster University Osteoarthritis index (WOMAC) is used to assess the severity of disease for surgical candidates.[8] The registry has been in effect since 1995, and the data obtained will be an invaluable

mechanism for health policy advocates and physicians to improve the quality of joint replacement surgery and to address the increasing population demands for their care.

COST

At the London Health Sciences Centre, the total cost of a hip replacement is approximately $10,000. The distribution is as follows: prosthesis cost at $2200, five day hospital costs at $5000, rehabilitation therapy at $1000, physician fees at $600, anesthesia fees at $400, orthopedic consult at $120, and miscellaneous drug expenses.[9] In Ontario, the entire cost is covered by OHIP. A common index to assess the outcome of a health care procedure or service is the cost utility measured in terms of quality-adjusted life year.[10, 11, 12] According to Dr. Bourne, total hip and total knee replacements cost $5000 per quality-adjusted life year. Comparatively, treatment of hypertension cost $15,000 per quality-adjusted life year and a coronary-artery bypass graft cost $55,000 per quality-adjusted life year. Any intervention below $20,000 is considered cost effective, therefore hip and knee replacements are considered cost effective.[13] The procedure is considered cost saving due to the enormous care-giver costs incurred by those who do not receive the intervention. In essence, total hip replacement virtually takes a person who is very disabled and restores them to normal quality of life.[14]

COMPLICATIONS AND READMISSION

The most common complications for joint replacement include: pulmonary embolism, deep vein thrombosis, compartment syndrome, stroke, myocardial infarction, avascular necrosis, dislocation and infection.[15] Due to constrained health care resources the lengths of post-operation stay have decreased by 50%, while readmissions due to complications after surgery have increased by about 32%.[16] With a hospital stay of three days there is a 10% chance of readmission; however, while a five or six day recovery period drops the rate to 2-3%.[17] Each readmission costs the health care system about $1000 per day.[18] While joint arthroplasty can be performed safely with excellent pain relief and significantly improved functional outcome, the incidence of complications and readmission poses a health management concern.

RECOVERY AND RANGE OF MOTION

The recovery period ranges from 12 to 15 weeks, depending on the occupation of the patient.[19] The range of motion of artificial hips is full, whereas for knees there is some decrease in range of motion. The increased functional capability brings about the greatest improvements in the patients' quality of life, along with improved sleep patterns and increased social interactions. The psychological profile of the patient is also markedly improved after surgical intervention.[20] However, functional requirements of patients vary depending on cultural background, due to differences in activities of daily living.[21] Hence, the success of joint replacement therapy for a patient is relative and largely determined by the individual's expected level of function in a society.

THE FUTURE

The delivery of hip replacements is an area that requires significant study and innovation. A recent international comparison of total hip arthroplasty cost and practice patterns indicates that 80% of surgeons were under pressure to reduce cost of the procedure, and 68% under pressure to reduce the length of patients' hospital stay. In this survey, 30% indicated that negotiating a reduced implant price from the supplier was the most important cost-cutting measure, as the variability of cost can be as much as 700% for an implant.[22] In other words, influencing orthopaedic surgeon's practice pattern should be a focus area of health care policy-makers.

Another possible strategy is to regionalize hip arthroplasty to an outpatient procedure. The apparent advantages of such a strategy are shorter lengths of stay, ability to perform increased number of procedures, decreased costs and shorter waiting-times. The possible drawbacks of such a strategy are increased readmission rates due to complications and increased use of community-based services. Studies in Alberta indicate that regionalization has had minimal impact on death and readmission rates, making this a plausible strategy.[23]

Also, primary care education to recognize congenital hip dysplasia is an equally important prevention strategy. At the London Health Sciences Centre, approximately 75% of hip replacements are related to dysplastic hip conditions.[24] The contribution of a family physician in recognizing and appropriately treating these conditions in infants would thereby alleviate the demands on the health care system through a cost-effective and efficient early intervention strategy.

The future of hip replacement surgery is indeed a promising one. In addition to the technological advances discussed previously, with the advent of minimally invasive or SMART instruments the surgical precision of the procedure is markedly improving which will lead to fewer complications and shorter recovery times once such instruments become commonplace in the surgical field.[25] In addition, on-going laboratory studies on the regeneration of cartilage surfaces may one day result in eliminating the need for the procedure entirely.[26]

While the medical advances will alleviate some of the demands for the joint replacement, the resource management issues shall determine the quality and quantity of care available to patients. Hence it is necessary for future physicians to be aware of the multi-factorial aspects of health care in order to effectively serve the growing demands of the Canadian population.

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Zebra Files

Amniotic Fluid Embolism – An Unpredictable and Often Catastrophic Obstetrical Emergency

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Amniotic fluid embolism (AFE) is a rare and unpredictable obstetrical emergency, occurring in less than 1 in 20,000 births. It is of considerable importance given that mortality rates exceed 60% for mothers and 20% for newborns. Symptoms begin with acute dyspnea and shock and frequently progress to cardiac arrest within minutes. Significant uterine hemorrhage, neurological sequelae, and fetal bradycardia often follow in patients who survive the initial cardiorespiratory events. Two models for the pathogenesis of AFE have been proposed and are detailed in this report along with basic principles of diagnosis and management.

Amniotic fluid embolism (AFE) is a rare and deadly labor event in which amniotic fluid gains entry into maternal circulation rapidly leading to severe respiratory, cardiovascular, and neurologic complications[1]. This condition was first documented in 19261; however, medical-historical accounts of the unexpected death of Princess Charlotte of Wales in 1817, and the public outcry leading to her obstetrician's ultimate suicide, suggests that AFE was observed much earlier[2].

Amniotic fluid embolism has been estimated to occur in 1 in 20,000 pregnancies[3]. As of yet, no preventive strategies have been developed for AFE, nor can it be predicted. Compounding this challenge, maternal and fetal mortality rates of over 60% and 20% respectively are regularly reported[4]. In patients who survive, neurological sequelae have been reported as high as 85%[4-6].

It should also be noted that AFE has been observed during ruptured membranes and caesarian section, though insufficient data exists to estimate incidence or predisposing factors[7].

PATHOPHYSIOLOGY

AFE occurs when amniotic fluid gains entry into maternal circulation. The current belief is that while fluid exchange does not necessarily lead to AFE, AFE is more likely to develop if the delivery has led to a greater-than-normal pressure gradient between the amniotic fluid and maternal circulation[8]. Other researchers have suggested that certain maternal factors and/or factors in the amniotic fluid may influence the onset of AFE[1].

While the specific pathophysiological events have not been clearly identified, the traditional pathway is as follows[9]:

- Amniotic fluid enters maternal circulation and reaches pulmonary circulation through the pulmonary artery. Right-to-left shunting is evident, as emboli are frequently found in coronary vasculature as well.
- Leukotrienes, surfactant, thromboxane A2, endothelin, vernix, fetal hair, and mucin act upon the vasculature of the lungs, leading to negative inotropism, capillary leak, and ultimately bronchospasm.
- Pulmonary congestion ensues, leading to right heart failure, decreased cardiac output, as well as hypotension.
- Disseminated intravascular coagulopathy may also occur secondary to the effects of fetal thromboplastins, leading to profuse bleeding from the uterus and any iatrogenic entry points into maternal vasculature.
- Systemic hypotension in the mother quickly leads to a decrease in uterine and placental perfusion, which in turn can trigger significant cardiovascular complications in the fetus.

A more recent theory suggests that AFE may be immune-mediated[10]. In this model, the maternal immune system mounts a response to fetal antigens released into the maternal intravascular space, as evidenced by increased levels of serum tryptase. This model suggests that it is not so much the fetal tissue itself that leads to symptoms as it may be fetal epithelial mucin-associated

Table 1: Proposed pathophysiological mechanisms of amniotic fluid embolism.

	Embolism Model[9]	Anaphylactoid Model[10]
Etiology	- Direct emboli of amniotic/fetal origin	- Immune response to fetal particulate matter
Pathophysiological Events	Amniotic fluid gains entry into maternal circulation - Fluid containing fetal tissue reaches pulmonary circulation, results in capillary leak and bronchospasm - Pulmonary congestion leads to a right heart failure with drop in cardiac output, hypotension - fetal tissue gains access to arterial system through shunt or patent foramen, promotes coagulopathy	- Amniotic fluid gains entry into maternal circulation - fetal tissues, in particular fetal epithelia mucin-associated glycoproteins trigger immune response as well as the release of procoagulant factors - vascular occlusion and vasospasms follow, trigger left heart failure and subsequent decline in cardiac output
Outcome	- Right heart failure, in addition to all other characteristics noted	- Left heart failure, in addition to all other characteristics noted

glycoproteins (which release procoagulant factors and leukotrienes), which trigger vascular occlusion and vasospasm. A key difference in this model is that it encourages left heart failure, an observation sometimes noted in AFE.

Table 1 compares the traditional and new AFE models. Some experts have suggested that both models may operate simultaneously; however, more research into these theories must be conducted before conclusions can be drawn.

DIAGNOSIS

Diagnosis of AFE is difficult due to its rarity, acute onset, and a lack of means for definitive diagnosis. Until recently, AFE could only be diagnosed by examining fetal contents in the vasculature during autopsy1.

Respiratory distress and cyanosis are the first signs of AFE and are believed to develop within one minute of fluid transfer. Hypotension and shock develop immediately after, as can symptoms of neurological origin such as confusion and seizures. Within only a few minutes, reports have estimated that as high as 80% of patients progress to cardiac arrest, of which 50% do not survive[8]. Beyond this point survival rates generally increase with the passage of time. Of those who survive, significant uterine hemorrhage secondary to coagulopathy is observed with a frequency of approximately 40%[13].

Clinical Suspicion

Generally, AFE develops during labour, though reports of occurrence earlier in gestation and post-partum have been made[10]. Clinical suspicion for AFE centers around dyspnea and hypoxia, cor pulmonale, disseminated intravascular coagulation, CVS shock, hypotension, neurological compromise, and fetal bradycardia[7]. Table 2 presents a summary of diagnostic criteria currently in use by the United States Registry for AFE.

Table 2: Key criteria for the diagnosis of amniotic fluid embolism[1].

1. Acute hypotension with or without ensuing cardiac arrest
2. Acute dyspnea and cyanosis leading to hypoxia, with or without respiratory arrest.
3. Coagulopathy – diagnosed either by severe hemorrhage without alternative explanation, or laboratory evidence of fibrinolysis.
4. Onset as early as onset of cervical dilatation, and as late as 30 minutes post-partum.

Transesophageal echocardiography has recently been investigated as a means to confirm clinical suspicion of AFE. Important findings include enlarged right ventricle and a D-shaped left ventricle that contracts normally and appears to be operating under reduced volume load. Significant dilation of the main and distal pulmonary trunks is also often evident. To support the diagnosis of AFE, other cardiac findings that may play a causative role in heart failure must be ruled out, including regional wall defects, valve rupture, congenital defects, and outflow obstruction[10].

Finally, modest serum tryptase elevation (<10 ng/mL) has been observed, assisting the diagnosis of AFE and adding evidence to the immune-mediated mechanism for the development of AFE symptoms[11]. Serum tryptase is released exclusively from mast cells and is significantly elevated in fatal anaphylaxis.

Post-mortem Diagnosis

Gross findings are relatively non-specific for AFE, and include patchy edema, atelectasis, disseminated intravascular coagulation, and pulmonary hyperinflation. Presence of fetal tissue matter, including epithelia and hair, in the maternal intravascular space may also be seen[11,12]. Immunohistochemistry is of

considerable utility in diagnosing cases of AFE by detecting particulates of fetal origin in the pulmonary vasculature. Specifically, high and low molecular weight cytokeratins, alcian blue PAS at pH 2.5, Attwood, Movat connective tissue, and oil red O stains can detect hallmarks of AFE, including fetal squamous epithelia, mucin and lipid droplets[11,12]. Monoclonal antibody TKH-2 has been recently shown to detect glycoproteins associated with AFE[12].

Differential Diagnosis of Amniotic Fluid Embolism

The differential diagnosis of AFE centers around the circulatory, respiratory, coagulation, and neurologic concerns and includes: *Hypotension/Shock symptoms* – Septic shock, Hemorrhagic shock, Anaphylactic reaction, Myocardial infarction, Cardiac arrhythmias; *Respiratory distress* – Pulmonary embolism of other etiology, Pulmonary edema, Complications of anesthesia, Aspiration; *Bleeding disorders* – Disseminated intravascular coagulation, Placental abruption, Uterine rupture, Uterine atony; *Neurological conditions* – Eclampsia, Epilepsy, Cerebrovascular accident, Hypoglycemia[1].

MANAGEMENT

Successful management of AFE stems from correcting, as rapidly as possible, the symptoms noted above. Interventions fall broadly under the categories of respiratory, circulation, coagulation, and fetal concerns.

Respiratory management includes monitoring oxygen saturation, and administering 100% oxygen through any means. Intubation may be considered if a more aggressive approach is warranted and could include positive-pressure ventilation starting at 5 cm H_20, increasing at 2 cm H_20 intervals until reasonable PaO_2 and SaO_2 levels are attained[14].

The most pressing concern regarding circulation is clearly the possibility of cardiac arrest, and must be addressed promptly. Electrocardiographic observation is useful in monitoring for arrhythmias[9]. Delivery of the child also reduces uterine pressure on the inferior vena cava and should be performed as soon as essential respiratory and circulatory activity is ensured1. Volume replacement consisting of an isotonic crystalloid solution should be also supplied to maintain a systolic blood pressure of at least 90 mmHg, with a minimum urine output of 25 mL/h indicating adequate organ function[14].

Hemorrhage and coagulation are the final barriers to successful recovery and must also be controlled quickly to promote recovery. Uterine massage may be useful in controlling uterine bleeding. If massage and normal pharmacological approaches are unsuccessful, a hysterectomy may be necessitated1. Blood component or whole transfusion represents first line therapy for correction of coagulopathy and should be administered as soon as critical respiratory and cardiac events, if present, are under control. Transfusion is dually-effective in this application as it has been shown to be successful in both correcting maternal coagulopathy as well as directly binding fetal particulates[1,8].

Fetal concerns center primarily around hypoxia and are best treated by emergency delivery or cesarean if resuscitation of the mother is unsuccessful.

CONCLUSION

Amniotic fluid embolism is a rare and often fatal complication of pregnancy which must be quickly recognized on the basis of clinical signs and symptoms and managed effectively to promote a favourable outcome for both mother and child. Current therapy centers on intensive management of cardiorespiratory, coagulatory, and fetal complications. Recent evidence suggests that an immune-mediated response plays a role in AFE's onset and rapid progression. Current research is directed towards this anaphylactoid component. More research needs to be done to understand AFE; however current theories may soon lead us to more effective diagnostic and treatment methods.

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A Review of Current Literature on NuvaRing®, a Contraceptive Vaginal Ring

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The number of choices for daily and non-daily hormonal methods of contraception are increasing. This allows women to choose a contraception method that fits their lifestyle and preferences. The combined oral contraceptive pill is the preferred method of many women and is often used as the standard that new methods are measured against. However, methods of contraception that do not require once-daily oral administration and ones that avoid daily fluctuations of hormones may improve compliance. Transdermal hormonal patches, intra-uterine systems and hormone injections have addressed these preferences of women. One of the newest products, NuvaRing, has been shown to be an effective, easy-to-use, tolerable and convenient method for hormonal contraception.

A novel contraceptive vaginal ring, NuvaRing®, offers women another choice for effective and reversible protection against pregnancy. It is a small, flexible, transparent ring that continuously releases 120 µg etonogestrel and 15 µg ethinyl estradiol daily. It is worn for 3 weeks followed by a 1 week ring-free period. NuvaRing® has an outer diameter of 54 mm with a cross-section of 4mm. Women are able to insert and remove the ring with ease. It offers a higher bioavailability than traditional combined oral contraceptive (COC) products since it does not require gastrointestinal metabolism to exert its effects. NuvaRing® provides a constant serum concentration of hormones since it is a controlled-release formulation; this differs from COC products. The systemic exposure of ethinyl estradiol is 50% less than that experienced with COC products that contain 150 mg desogestrel and 30mg ethinyl estrodiol.

EFFICACY

NuvaRing® has been shown to have a Pearl Index of 0.65 (95% CI 0.24-1.41).[1] The pregnancies reported may have been attributed to misuse of the product like extended ring-free periods. Similarly, another study reported the Pearl Index to be 0.77 (95% CI 0.37-1.40).[2] Again, noncompliance and a misunderstanding of how to use the ring were noted. In a review of COC products, the Pearl Index was found to be 0.04.[3] The Pearl Index is defined as the number of pregnancies per 100 women-years of exposure.

CYCLE CONTROL

Women need contraception that minimizes irregular bleeding and allows them to experience a withdrawal bleed so that they can be reassured they are not pregnant. Extended bleeding or heavy bleeding may also affect a contraceptive product's acceptability and user compliance. NuvaRing® offers excellent cycle control compared to COC products. The incidence of irregular bleeding, defined as any bleeding while the ring is in place, was found to be <5%.[4] This was lower than the incidence of COC groups at 5.4-38.8%.[4] As well, withdrawal bleeding, defined as bleeding when the ring is not in place, was 98.5% in all cycles.[2]

OVARIAN FUNCTION AND CERVIX

Reversibility of birth control is an important factor for women in choosing a method of contraception. A convenient method should adequately suppress ovarian function during use and allow quick return of ovarian function once the product is discontinued. Two studies monitored follicular diameter on vaginal ultrasound as a measure of ovarian function while using the ring. Maximum follicular diameter was found to be 11 mm during treatment with NuvaRing®, a value comparable to that obtained with COC products.[5] Furthermore, only three days of consecutive NuvaRing® use is required for interference with follicle growth.[6] Ovarian suppression after 3 weeks of NuvaRing® use and 21 days of COC is comparable.[6] The time to ovulation after removal of the

ring is approximately 19 days.[7] There was no data to suggest an increased risk for cervical abnormalities with use of the NuvaRing®.[1]

BLOODWORK

A risk associated with contraceptive hormones is the development of venous thromboembolism. The estrogenic component is said to be the main cause but the role of the prostegenic component is currently under investigation as well. NuvaRing® does increase Factor VII levels while COC products decrease it.[7] There were no other differences between the two contraceptive methods in any of the other coagulation factors measured.[8] NuvaRing® causes a higher antithrombin and Protein C activity.[7] However, COC products and NuvaRing® are comparable in anticoagulation and fibrinolytic activity in general. Lipid profiles are influenced by contraceptive hormones. Estrogen has a favourable effect on lipid profile while progestin may counteract this effect by virtue of its androgenicity. Etonogestrel has less affinity for androgen receptors which may decrease its unfavourable effect on lipids. NuvaRing® was found to have a minimal effect on lipids with no changes in total cholesterol and a decrease in triglycerides.[9]

TOLERABILITY

In comparison to COC products, NuvaRing® has a higher incidence of vaginal discomfort, vaginitis and ring-related events such as foreign body sensation, coital problems or expulsion associated with its use.[3] The most frequently reported adverse events were vaginitis (13.7%), leucorrhea (5.3%), and vaginitis (5%).[1] However, there were few estrogen-related symptoms such as breast tenderness and nausea. This may be attributable to the lower dose of ethinyl estradiol as compared to most COC products.[2] Mean body weight increase was found to be 0.43 +/- 3.35kg over 13 cycles of treatment.[1]

USER ACCEPTABILITY

The NuvaRing® provides continuous contraception without the daily hassle of taking a pill. It is easy to insert and does not require the insertion to be performed by a health care professional. NuvaRing® costs approximately $25 a month, which is similar to the contraceptive patch but more expensive than COC products. It is important to note that NuvaRing® cannot be used with certain secondary forms of contraception such as the diaphragm. It is a non-biodegradable product made of ethylene vinylacetate copolymers and magnesium stearate. Few studies on the toxicity of these materials when used in contraceptives have been performed to date but no adverse local or systemic responses have been seen over extended periods in vivo.x In a user acceptability study, women responded that they were 96% satisfied with the ring after 13 cycles of use, and 97% would recommend the ring.[11] 94% of partners of women using the ring reported rarely or never minding that the ring was being used.[10] If desired, the ring can be removed for up to 3 hours at a time for sexual intercourse.

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A New Plan for Plan B

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On April 19th, 2005 Health Canada made the Emergency Contraceptive pill, Plan B, to available behind the counter without a prescription.[1] A doctor's visit is no longer required and pharmacists can dispense Plan B after assessing the appropriateness of emergency contraception. The pharmacist is also responsible for providing counseling on the administration and possible contraindications of the medication, and will make referrals for future reproductive health counseling.[2]

WHAT IS PLAN B?

According to the World Health Organization, Plan B is the gold standard in hormonal emergency contraception.[3] Plan B contains two doses of 0.75 mg of levonorgesterol to be taken 12 hours apart. Common side effects include nausea, vomiting, dizziness and fatigue.[3] The use of Plan B results in a pregnancy rate of only 1.1% - a reduction of 89%.[3]

While Plan B can be taken up to 72 hours after unprotected intercourse or contraception failure, the maximal effectiveness is within the first 24 hours after intercourse.[4] Therefore increasing accessibility to Plan B is instrumental in reducing the time from coitus to emergency contraception administration. Over 80 countries have now approved pharmacists to dispense emergency contraceptive products containing progesterone.[5]

REGULATORY CHANGES IN CANADA

To improve the timely access to Plan B, Health Canada amended the *Food and Drug Regulations* to remove Plan B from Schedule F, a list of substances intended for human use that require a prescription.[6] By allowing the sale of Plan B without a prescription, the access to the drug is improved.[6] This move has the potential to greatly increase the drug's effectiveness.[6] To remove Plan B from Schedule F, Health Canada reviewed three decades of studies covering thousands of women and concluded that no serious or lasting adverse events were associated with emergency contraception.[6] Health Canada also examined the evidence from other countries that allowed easier access to emergency contraception.[6] In these countries, excessive use of emergency contraception (more than three times per year) rarely occurred.[6] This is also supported by a recent study done in British Columbia, which has permitted Plan B to be available behind the counter since 2000.[7] The incidence of women using emergency contraceptive greater than three times during the two year study was only 2.1%.[7] Health Canada thus concluded Plan B satisfied all of the criteria for nonprescription status.[6]

While Health Canada decides the prescription status, it is the National Association of Pharmacy Regulatory Authorities (NAPRA) that determines whether a drug is placed behind or over the counter.[6] NAPRA classified Plan B as a Schedule II drug, meaning that it will be placed behind the counter. Health Canada has supported this policy, noting that pharmacists are well-positioned to play a major role in providing contraceptive counseling.[6] However, an editorial in the Canadian Medical Association Journal questioned the need that any professional consultation for emergency contraception, pointing out that the behind the counter status of Plan B compromises a woman's privacy, increases cost with professional fees, and creates a barrier to access in small towns.[8]

THE PHARMACIST'S ROLE

Another barrier related to Plan B's behind the counter status is that pharmacists can refuse to dispense the drug, an issue of

important consequences in regions with only one drug store.[9] The conflict between professional obligations and personal moral beliefs, although familiar for physicians, is new for pharmacists who believe dispensing emergency contraception is equivalent to giving abortion.[10]

Currently, the NAPRA Code of Ethics requires that if a medication is in conflict with the pharmacist's personal beliefs, the pharmacist must pre-arrange access to an alternate source that minimizes inconvenience to the patient.[11] Pharmacists must also provide their patients with information that is truthful, accurate and understandable so that the patients are able to make informed choices about their health care.[11]

Some pharmacists groups have called for changes to the Code of Ethics that would add a conscience clause to protect pharmacists from liability for refusing to perform an act based on conscience.[2,12] A challenge has also been made to the current guidelines on referral, questioning the appropriateness of requiring pharmacists to refer a patient for the same procedure that s/he originally objected to in good conscience.[12] Other writers have pointed out that a pharmacist's democratic right to their own moral values does not outweigh their fiduciary obligations to their patients because they have willingly entered their field.[13]

A commentary in the New England Journal of Medicine points out that although the pharmacist declines to dispense Plan B because he or she believes that the drug ends a life the patient may not share the pharmacist's beliefs. If the patient does become pregnant as the result of failure to have timely access to Plan B, she may then face the question of abortion — a dilemma that could have been avoided.[13]

DIFFERENT DEFINITIONS

At the crux of this controversy is Plan B's mechanism of action. A recent review of the literature concluded that the main mechanism of Plan B is interference with ovulation.[14] While it may also alter the endometrium by making it unsuitable for implantation,[14] a recent study failed to show levonorgestrel alters endometrial receptivity.[15] Crucially, Plan B will not interfere with an already implanted embryo.[16] Since Plan B does not interfere with an existing pregnancy and acts prior to implantation, the Society of Obstetricians and Gynecologists of Canada labels Plan B as a contraceptive, not as an abortifacient.[17]

Using these definitions, and 2001 figures from Statistics Canada, it has been estimated that emergency contraception has the potential to prevent most of the 106,418 abortions (including 19,936 among teenagers) performed in Canada every year.[10] The use of behind the counter emergency contraception in British Columbia has allowed increased use of emergency contraception, and thus perhaps fewer abortions.[8]

However, these definitions are problematic for individuals and groups who hold the belief that life begins at fertilization.[2,9,10] Pharmacists who hold this belief find Plan B akin to abortion because Plan B can still interfere with the implantation of a fertilized embryo.[2,9,10]

In Colombia and Chile, whose laws protect human life at the moment of fertilization, emergency contraception like Plan B is illegal.[18] Under Canadian law, preventing fertilization or inhibiting implantation does not compromise the life of a child.[19]

FUTURE PLANS

The refusal of a pharmacist to fill a prescription may remove timely access to patients, especially those living in a rural area with a lone pharmacy.[9] The loss of privacy and additional professional fees are increased barriers to women, especially those who are financially disadvantaged.[7] At the same time, those pharmacists who have moral objections to emergency contraception are placed at odds with their professional obligations.

Large studies of self-administered emergency contraception in the United States and Scotland have demonstrated that increased access does not increase risky sexual behaviour or decrease regular contraceptive use.[20,21] The safety and potential benefits of Plan B have prompted the Society of Obstetricians and Gynecologists of Canada to lobby for the drug to be sold without the help of physician or pharmacist.[2] Not only would over the counter status improve access to emergency contraception, but also it would allow women to better control their reproductive health and alleviate some pharmacists of their own moral conflicts with dispensing Plan B.

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"Born to be a Burden": A dramatic way to educate medical students about the ethics of prenatal screening

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Since the implementation of a province-wide maternal serum screening (MSS) pilot program by the Ontario Ministry of Health in 1993, MSS has quickly become widely accepted in the management of pregnant women in Ontario, as well as across Canada and other developed countries. Unfortunately, the quick evolution of MSS into a routine test for pregnant patients has not been accompanied by enough societal debate on the ethical issues surrounding MSS. A review of literature reveals paucity in the discussion of MSS in association with issues of eugenics, disability rights, abortion, choice, and the rights and responsibilities of the pregnant woman to the fetus, her family, and society. Additionally, healthcare providers have been shown to have poor knowledge about the sensitivity and specificity of MSS, and they often fail to provide adequate and non-biased counseling and education in the provision of MSS to patients. As such, the lack of debate and education about this seemingly routine but controversial test is unsettling. Thus, an innovative way to stimulate discussion about MSS and its potential implications to medical students and health professionals is presented.

In 1993, the Ontario Ministry of Health implemented a pilot project known as Maternal Serum Screening (MSS). Using the woman's age and three serum markers: α-fetoprotein, human chorionic gonadotropin, and unconjugated estriol, MSS estimates the risk of having a baby with Down syndrome, an open neural tube defect (NTD), or Trisomy 18. MSS is a voluntary screening exam that was intended to allow women to make informed decisions about their pregnancy. However, studies have shown that healthcare providers often fail to indicate its voluntary nature[1], fail to adequately explain the purpose of the test and the meaning of the results[2], and often underestimate the false-positive rate of MSS[3]. In addition, the healthcare provider's attitude towards abortion often affects the provision of this test[3]. Finally, evaluations of the educational material distributed to patients indicate a lack of consistent, comprehensive, and unbiased information about MSS[4]. Despite this, participation in the MSS program by prenatal care providers has been very high in Ontario, with an estimated 88% of healthcare providers routinely offering it[3]. The adoption of MSS as a routine test by the medical community has blunted societal debate regarding MSS in association with the issues of eugenics, disability rights, abortion, and the rights and responsibilities of the pregnant woman to the fetus, her family, and society. It is imperative that a forum exist to help stimulate these discussions. Medical educators have demonstrated that literature[5] and theatre[6] are effective in provoking thought and stimulating discussion. As such, the theatrical piece entitled *Born to Be a Burden* was written to address these issues.

This play contains four short skits that tackle the subject from a chronological perspective. By having the skits span past, present, and future, we hope to show the audience the origins of the ethical issues imbedded in MSS and carry them through to the possible futuristic consequences. Therefore, the intention and rationale of each skit in this play will be discussed.

The first skit involves a discussion about eugenics by some of its most prominent supporters from various periods in history. Most of the dialogues within this skit are unaltered excerpts from the original authors. This was intended to provide the audience a flavour of the way these authors thought and how these thoughts were influenced by the political, social, and scientific philosophies at the time.

A particularly charged issue arose in the writing of this skit. "Eugenics" is associated with numerous atrocities committed by various governments during the 20th century. However, it was crucial to put forth the idea that MSS is a form of negative eugenics and that eugenics encompasses more than just atrocities. Eugenics includes the aspirations of philosophers and scientists and their vision for a better society. Plato and Sir Francis Galton led the charge into the subject, with Dr. John M. MacEachran concluding. Dr. MacEachran's recounting of the history of eugenics and sterilization in Alberta illustrates that the movement is not

merely confined to Nazi Germany.

The next skit focused on how individual beliefs could potentially interfere with the provision of care to a patient. Doctors are human. Life experiences and relationships alter patterns of thinking, and physicians bear no immunity to individual biases and opinions regarding ethically-charged issues. Ethics courses in medical school, however, preach that individual biases must be left at the door when one enters medicine. Is this "neutrality of opinion" a reasonable request to make of physicians? Do doctors succeed in providing "unbiased" information?

Two doctors face a patient in an office setting to provide information. The subject matter is MSS and the medical conditions for which it screens. Each physician presents data selected from the medical literature in a factually accurate and seemingly non-biased fashion. However, when the two physicians simultaneously counsel the patient, it becomes obvious to the audience that one physician wishes the patient to receive the MSS, while the other does not. The following is a short excerpt from the skit to illustrate the style of the script:

Dr. 1: In the unlikely event that your baby has a severe form of NTD, it would be detected by U/S later in your pregnancy, and in the case of a minor lesion both the MSS and U/S are ineffective.

Dr. 2: The MSS is 90% effective at predicting severe NTDs. Any minor defect that is detectable can alter our decision of delivery method or the defect could potentially be treated in utero.

Dr. 1: Any in utero treatments for NTDs are still in the experimental phase.

The hope of the authors was that this skit would force audience members to consider the power of language when presenting medical topics for patient consideration.

The third play in the series explores the potential impact of MSS on people currently affected by disease or disability. The play introduces us to John Watson, a man who is driven to find a cure for the disease that killed his first love, Cecilia. Unable to find a cure, he turns to eliminating the disease by screening it out. However, he begins to question his discovery when he wonders what this method implies about Cecilia.

It is hoped that this play would stimulate the audience to think about a few troubling things: What would have happened if the test had been available before Cecilia had been born? What is John now saying about the value of Cecilia's life and others like her by taking this route to "cure" disease? After all, it was Cecilia who inspired the research in the first place! How does one balance out these considerations against the good done by eliminating such terrible diseases?

In our fourth skit, set sometime in the future, the audience visits the consequences of a slippery slope approach to MSS. The Canadian Health Minister argues that pre-implantation genetic diagnosis (PGD) is a logical extension of MSS. Instead of screening for genetic diseases in fetuses, PGD allows "screening" of the embryo before implantation. Mothers will no longer need to agonize over whether or not to abort a fetus; the flawed embryo will never be implanted.

As time passes, PGD becomes as widely accepted as MSS is today. Subsequent newscasts narrate the potential consequences. Loss of genetic diversity leaves children vulnerable to a previously innocuous disease. Parental expectations of their "perfect" children cause a string of teenage suicides. Preference for boys over girls leads to an unbalancing of the population. The stark contrast between the potential benefits and risks of allowing our children to be genetically screened engages the audience to reconsider the original acceptance of MSS.

The intension of weaving together so many short skits was to expose the audience to the many complicated ethical issues involved in Maternal Serum Screening. Pro-life and pro-choice groups clash over the background issue of abortion. Hints of eugenics may be present in the underlying suggestion that individuals with Down Syndrome, neural tube defects, or Trisomy 18 are less valuable to society. MSS as a "standard of care" suggests that individuals have an obligation to screen for such conditions because society does not wish to bear the "burden" that such "disabled" lives will inevitably produce. The ongoing search for genetic causes of disease, coupled with the technology to screen for such diseases in-utero, suggests that the MSS could easily be expanded to include other genetic conditions. But who will decide which conditions are to be included?

MSS has been introduced to our society without an appropriate degree of ethical debate, and this lack of discussion is being propagated in medical schools. The MSS is often introduced as a simple test to offer parents more information about their pregnancy. By using drama in medical teaching, the ethical dilemmas concerning MSS can be explored more deeply. Not only do the authors and actors of such productions learn about the ethical territory, but audience members are also educated by the production. Drama can provide the audience with concrete examples of the potential consequences of MSS, both positive and negative. It puts faces to abstract concepts and thus can be used to reach a variety of potential listeners. If done effectively, it can captivate interest, challenge intellect, and stimulate emotions. Most importantly, when followed by an appropriate forum, drama leads to discussion.

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Non-Directive Counselling: Rhetoric Or Reality?

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"Non-directive counselling", with its emphasis on respecting a patient's right and ability to make autonomous choices, is widely regarded as being central to the practice of genetic counselling, particularly in regards to prenatal screening. Through non-directive counselling, health care professionals endeavour to empower their patients to make informed and independent decisions, based on the respective context of their own life and free from outside coercion. However, some criticisms of the non-directive approach have been raised within the medical community. This paper seeks to outline some of these objections and to examine the role of non-directive counselling in patient care.

Unquestionably, prenatal genetic screening has created an abundance of new and exciting opportunities within the field of prenatal care. Armed with our ever-expanding array of genetic tools, it has become relatively easy to screen for and identify an abundance of different traits and disorders in utero. However, what is not always so simple is deciding what exactly to do with that information once it is obtained. From a patient perspective, genetic screening in general and prenatal screening in particular can result in the need to make extremely difficult decisions, and the need for assistance from health care providers in deciphering the information presented can be profound.

Understandably, while genetic testing in pregnancy care holds immense therapeutic potential, these tests have also been accompanied by a considerable amount of controversy because of potential misuse. Consequently, the medical community has long sought to decide how best to employ the tools granted by advancements in genetics appropriately and responsibly. With regards to prenatal genetic screening, 'non-directive counselling' has become established as a central component of patient care. Shaped by the medical establishment's long-standing belief in a patient's right to autonomous choice, 'non-directiveness' dictates that a provider's obligation is to empower their patient to make informed and independent decisions, free of coercion.

However, despite its seemingly widespread acceptance as a central tenet of genetic counselling, the true value of non-directive counselling has been called into question by some. Increasingly, members of the medical community have wondered openly whether the concept of non-directiveness is more rhetoric than reality, while at the same time going so far as to even question whether non-directive counselling is ever truly possible. This paper intends to examine some of the objections and criticisms raised with regards to non-directive counselling and to examine its role as a fundamentally patient-centred approach.

NEUTRALITY: IMPOSSIBLE?

Despite the best efforts of non-directive counselling to assert objectivity and neutrality, both research and anecdotal evidence suggests that this is often not the case. This occurs for a variety of reasons, not least among them being that it is often easier said than done for a counsellor to absolutely suppress his or her own feelings and/or biases while counselling. Although they might make every possible effort to maintain neutrality, many counsellors admit to occasionally falling short of this goal, whether through subtly expressed opinions, or even unconsciously through more subtle messages conveyed via body language or tone of voice.[1,2] Some studies have further shown that while the principle of non-directiveness is embraced by professional bodies, at least throughout the Western world, how it is actually employed and to what degree can vary markedly from location to location.[2]

The difficulty of non-directiveness has also been attributed to the inherent structure of the patient-counsellor encounter. Several commentators propose that an apparent conflict of interest exists in the attempt to uphold a sincerely non-directive methodology while at the same time working towards preventing a given disorder. Along those lines, Clarke contends that "an offer of prenatal diagnosis implies a recommendation to accept that offer, which in turn entails a tacit recommendation to terminate a pregnancy if it is found to show any abnormality."[3] Upon receiving the potentially traumatic news that their baby is "abnormal", many patients simply do not hear anything else, making it difficult – if not impossible – for a counsellor to present all options on equal footing. Other outlets have supported similar views, arguing that while the options for medical treatment are typically presented in a descriptive manner, patients often understand them in a normative sense as well. Essentially, the offer of "medical treatment" is not simply understood as providing an objective description of what is wrong with the patient or their baby and what their options are, but also as what should be done to treat their condition.[4]

SPECIAL PATIENT-PROVIDER RELATIONSHIPS

The special challenges of the relationship between a patient and their primary care provider have also been cited as complicating a counsellor's ability to provide truly non-directive counselling. While counselling is often performed by counsellors who do not have a past professional relationship with the patient, it is very common for patients to consult their family doctor, for example, when faced with such difficult decisions. Though the previous establishment of trust, rapport, and a good working relationship may be beneficial in some ways, it may also result in the patient becoming more inclined to simply rely on their family doctor's advice unquestioningly. Of course, the opposite may be true in certain situations as well—patients may only be able to achieve true empowerment once they feel that their doctor is able to appreciate the wider context of their life. Yet as Evans & Britt point out, "it is logical to hypothesize that the longer the prior association of practitioner and patient, the greater the threat to patient autonomy".[1] Whereas the power differential between patient and provider is of critical importance to questions of patient autonomy, in situations where a level of trust is already strongly entrenched, the potential for physician directiveness (and thus a betrayal of patient autonomy) is that much greater.

PROVIDERS' OBJECTIONS

Regardless of whether non-directiveness is truly attainable or not, some members of the medical community have questioned whether it is even an appropriate ideal to strive for in all cases. Notably, some commentators have argued that occasionally, recognizing and respecting a patient's autonomy should not be the primary goal. Whereas respect for a patient's autonomy requires the practitioner to provide information and enable informed choice, the principle of beneficence might require the practitioner to protect the patient from making decisions that may cause them distress or harm in the future. If the doctor's role is considered to include both the principles of beneficence and respect for autonomy, it follows that in certain cases counsellors might be justified in abandoning purely non-directive techniques and attempting to persuade patients to reconsider their decisions for the patient's own benefit.[5]

Similarly, many counsellors have at times expressed disfavour with pure non-directive counselling due to its restrictions against insuring that those counselled are fully aware of the moral consequences of their decisions. In his exploration of the value of non-directiveness in genetic counselling, Clarke questions whether the medical profession has "fled so far from medical paternalism that we deny ethical responsibility for our professional activities?" Clarke further expresses resentment at "being obliged, as I often feel that I am, to be economical with the truth in discussions with families" in certain situations in order to avoid adding to feelings of sadness and guilt.[3] For Clarke and others, non-directiveness can at times amount to merely 'passing the buck' by shirking moral and professional responsibilities at a time when patients face already incredibly difficult choices and might need a counsellor's experience and expertise most.

NOT SHARED CONCERNS?

Conversely, it might not be surprising to observe that in many cases the principles of non-directive counselling are not valued particularly highly by the very people whose rights it seeks to protect. While the medical profession itself holds up issues such as non-directive counselling, privacy, and informed consent as items of utmost importance, studies of the public's opinions regarding genetic counselling highlight entirely different concerns. Specifically, such studies indicate that while patients do not wish to be expressly told what to do, they do expect to be given some guidance from their health care providers and not simply information and facts alone.[6] Additionally, many consumers of genetic services believe that if asked, providers should offer their opinions of what they would do if in the same situation.

SUMMARY

As physicians and counsellors, it is important to remain aware of the fact that the context of every patient's life is necessarily different from one's own, and that the ideas and assumptions that shape one's own world view do not necessarily apply to someone else's. It is our responsibility as physician-counsellors to recognize and respect that context from which the patient has been shaped, to do our best to assist our patients to assess their own situations as completely as they can, and finally, to empower them to act accordingly. Granted, it is difficult – maybe even unrealistic – to imagine that all obstacles can be overcome in order to achieve true neutrality; as stated above, it is rare that a practitioner can remove him/herself and his/her opinions so completely from the decision making process so as to grant patients absolute autonomy. As expressed by Evans & Britt, true neutrality is "an ideal to be striven towards rather than an actuality to be achieved".1 Clearly, though it remains widely accepted as a central pillar of genetic counselling, non-directive counselling is by no means free from difficulties and complications. However, to admit such a reality should by no means diminish efforts to achieve the goals of non-directiveness.

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The Experience of Infertility For Women From a Psychological and Social Perspective

Shirley Chow, Meds 2006

For as long as men and women have been procreating there have been those that have experienced infertility. Infertility, defined as the inability for a couple to conceive after 12 or more months of regular intercourse without contraception, can be a significant life crisis for a couple who is planning to start a family. Because this can be extremely devastating for couples of childbearing age, there is an urgent need for health care providers to respond to the suffering of infertility patients and to interpret the personal meaning of the experience from an infertile person's perspective. Not only is infertility a medical and physiological state for the individual, it is also a significant psychological state conditioned by social realities. The focus of this paper is to promote a greater understanding of how women, desiring children, perceive, react to, and cope with their inability to conceive, to the end that health care workers may be able to provide support and guidance to help these women.

Queen Mary of England, daughter of Henry VIII and Katherine of Aragon, inherited the throne, with one of her most important goals the birth of a child who might succeed her. Though she would convince herself she was pregnant, once suffering from a "phantom pregnancy" wherein she gained the requisite weight, stopped menstruating, and suffered with morning sickness, she was never able to conceive.[1] Indeed her "phantom pregnancy" was subsequently attributed to a tumour in her stomach which, combined with the lack of a menstrual cycle and her own fervent prayers, made her believe she was pregnant. The humiliating and heartbreaking realization that she could not have a child is viewed by contemporary historians as the greatest life tragedy of Mary "the Barren Queen" of England.

Queen Mary's anguish surrounding her infertility is not unique to her. Many women have had to cope with infertility throughout the ages. Although infertility can seem like a very individual and personal struggle, it is important for women to know that they are not alone. Today, it is estimated that 10% to 20% of couples will be unable to conceive after one year of actively attempting to become pregnant.[2] A great need exists for health care providers to interpret the personal meaning of the experience from an infertile woman's perspective and to respond to their suffering compassionately.

CURRENT EXPERIENCES OF INFERTILITY

Recent census statistics indicate that a family composed of a married man and woman and their child(ren) continues to be a norm in American society.[5] In Canada, the desire to have and raise a family has been described as "the most basic and shared human dream".[6] Many women expect to bear a child, and the decision whether or not to have children is described as a conscious, ongoing consideration for a woman entering adulthood, integrally linked to her developing life plans.[4] The norms of society portray parenthood as a desirable and/or inevitable part of life, and create a social structure in which childless women are considered an unenviable social anomaly. Despite 30% to 40% of infertility cases being caused by a male factor, studies suggest that infertility is a more stressful experience for women than for their male partners.[2,3] Regardless of whether the infertility is a result of a medical problem or some unknown factors, this failure to fulfill the parenthood role can be detrimental to a women's personal identity and result in a myriad of negative psychological states.

The state of feeling "powerless" comes from a loss of control. This feeling extends beyond a woman's physical body. An infertile woman may feel a loss of control with respect to her relationships with others, to planning for her future and planning her family, and to the basic exercise of freedom of choice over her fertility.[7] As one woman who was unsuccessful with fertility treatments noted:

> *"It would be one thing if I had decided I didn't want children, but the fact that I have no control over it, that I've done all*

the medical interventions, and still have no control. I think that's probably the most negative thing—the feeling of helplessness."[7]

In our society, infertile women become stigmatized because they are unable to conceive. In one study of 71 women, nearly all of the women were able to provide detailed accounts of negative responses to their infertility from close family members or friends, as well as from acquaintances and strangers.[8] These women developed negative self-perceptions that led them to feel alienated and isolated from society. In a related study by Sandelowski and Jones, women felt "forced to tell and explain" their childless state, and to hide their negative feelings in order to sustain social relationships (e.g. attend a baby shower for a friend or ignore insensitive comments). Infertile women also constrained or excluded themselves from interactions with others because of their infertility.[9] These women also felt pressured to receive inappropriate information or support, such as pitying comments and "unscientific advice" like "why don't you relax or take a vacation, then you'll get pregnant".[10] Societal behavior surrounding parenthood and reactions to infertility contribute to the devastating emotional distress experienced by infertile individuals.

Infertile women who have their hopes of bearing children shattered can also become clinically depressed. In a qualitative descriptive study of 25 women who were infertile due to medical or unknown problems, a prevalent theme were feelings of inadequacy.[7] The pattern of depressive symptoms associated with infertility is well documented, and occurs most commonly in a cyclical pattern of hope at the possibility of conception and despair with the onset of menses.[11] Months of this habitual disappointment can eventually lead to chronic depression. Studies have shown that infertility depression levels in woman can rival those of cancer patients.[12] It has also been observed that infertile women have used coping methods of avoidance to deal with their stressors. Avoidance-coping strategies may temporarily serve to offset feelings of distress by helping women ignore the issue, especially if they have unsupportive social networks. But these strategies can also be maladaptive by inhibiting women from processing the meaning of the negative life event. For instance, women in the study who employed more avoidance-coping strategies had greater negative emotional feelings (i.e., greater depression, greater overall psychological distress, and lower self-esteem).

ROLE OF THE HEALTH CARE PROVIDER

Given the psychological pain and grief infertile women experience and the strained relationships that can occur, health care providers need to respond and offer guidance. In addition to providing factual information on physiological causes and treatments of infertility, they can also facilitate a conscious awareness of the ideological pressures and the negative self-perceptions that lead to feelings of powerlessness and stigma associated with infertility. With the increased understanding of their stigmatized situation, infertile women are empowered to take more control of their lives by considering alternative life choices and other options for parenthood, and to better understand how to cope with their situation.

Health care providers can also acknowledge depression as a risk factor associated with unsupportive social interactions, and that some level of depression is natural and appropriate in the mourning process of such a great loss.[13]

Infertile women should also be encouraged to take a more proactive approach rather than coping by avoidance strategies. These approaches could include information seeking or emotional processing activities such as attending support groups and journal writing.[14]

A discussion on the psychological and social experience of infertility of women would not be complete without exploring their desire for infertility treatment. The desire to have a child and the hope that a medical treatment will successfully lead to pregnancy can motivate women to continue infertility treatments despite low success rates.[7] Even with the risk of draining all financial resources on medical treatments such as in vitro fertilization (IVF), and the emotional and physical risks associated with treatment, many women still seek medical solutions.[4] This drive to seek treatment at any cost may be due to a societal philosophy that doing 'nothing' is akin to failure to take responsible action, whereas doing 'something' is viewed as leading to the betterment of a given situation. Therefore many women view the treatment risks as a necessary sacrifice and a by-product of persistence.[4] When societal views of risk and responsibility are teamed with women's persistence in the pursuit of pregnancy, medical treatment may be taken to extremes. Thus, health care providers, especially those involved with reproductive technologies, must educate infertile women to foster realistic expectations about potential outcomes of treatment options.

COPING WITH INFERTILITY

The experience of infertility can ultimately be a transformational process from the initial emotional distress to accepting and coping with the diagnosis. Acknowledging the emotional frustration and despair infertile women experience helps to prevent women from inappropriately blaming personal inadequacies for infertility for which there is most likely no responsibility or from inappropriately equating the inability to bear or carry a child with the inability to parent.[15] With time, meaningful reflection, and counseling, infertile women may begin to accept the reality of being unable to bear children and redirect their focus to seek alternative solutions to meaningfully fulfill the role of motherhood. As one woman reported:

"I appreciated being told a definite diagnosis [and prognosis] because then I realized that pregnancy wasn't important, it was the parenting that was important to me, and we put ourselves on an adoption list".[7]

CONCLUSION

The psychosocial experience of infertile women may commonly include feelings of powerlessness, stigmatization from society, and clinical depression. Guidance and assistance by competent health care professionals optimally in a supportive environment can assist women to interpret their reactions to the diagnosis, to deal with feelings of inadequacy, and to regain their sense of purpose.

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Perinatal Care for Adult Survivors of Child Sexual Abuse

Nelvia Van Dorp, B.Sc., Meds 2006

Child sexual abuse (CSA) has a sordid history of being prevalent and underreported, with short and long-term consequences that are variable, complex and poorly understood. Nevertheless, there is ample evidence to indicate that awareness, sensitivity and collaborative approaches on the part of care providers can improve the perinatal experience for women who were sexually abused in childhood, minimizing retraumatization risks and empowering women with respect to their own bodies.

The prevalence of child sexual abuse is difficult to determine. Definition and methodological differences in various studies and population surveys complicate the calculation, as do the confounding factors of underreporting and repressed memory. Girls are more frequently victimized than boys, with one in three to four women and one in six to eight males reporting sexual abuse before age 18.[5,9] Estimates range from 12-38% of women, and as high as 59% with less restrictive definitions that include touching and exhibitionism.[5,9,10,12,16] Women with a history of CSA are at risk of revictimization, with between 15% and 79% reporting rape in adulthood.[14] Notably, women who experienced CSA were found to be between two and eleven times more likely to be sexually abused in adulthood than non-abused women.

Since the early 1980's, there has been a significant increase in efforts to document and explain the sequelae of CSA that affect women's health throughout the lifespan. There is a wide range of documented outcomes, which seem to vary in accordance with the type, duration and timing of the abuse, the perpetrator's relationship with the child, the age and outcome of disclosure experience, other traumatic experiences, the amount and type of support the child received, and the health of other relationships during the child's development.[1,4,13] CSA has been linked with post-traumatic stress disorder (PTSD) symptoms that occur consistently, or present in situations that mimic the setting or experience of previous abuse, or arise as a result of other triggers.[2,4,11] CSA is also associated with increased treatment in adulthood for other psychological symptoms, many of which seem to arise from coping mechanisms that become maladaptive later in life.[12] These include such symptoms as depression, anxiety, low self-esteem, suicidal gestures and attempts, sleep disturbances, personality disorders, dissociative disorders and panic attacks.[12] There is also a much higher rate of somatoform disorders and chronic pain without organic explanation in CSA survivors.[9,15] Interpersonal difficulties of many types including general social functioning, and particularly couple or spousal interactions including dyspareunia and sexual dysfunction, are also more prevalent in CSA survivors.[3]

Pregnancy and perinatal experiences are often fraught with difficulty for women who were sexually abused as children. For some women, internal examinations, cervical smears, childbirth, and even visits to the dentist trigger memories of CSA experiences and may lead to dissociation, vaginismus, PTSD symptoms

or other difficulties.[2,11] There are often parallels to the abuse experience because of the anatomy involved and the power differential in the relationship, especially if procedures and the reason for doing them are not well understood, if movement is restricted, or previously traumatized body parts are involved.[2,8,11] Postpartum issues such as risk of depression, concerns about their ability to protect their own child from abuse, and fears about the 'cycle of abuse' can also be particularly distressing for mothers who are CSA survivors. Throughout the childbearing years, there are particular concerns that caregivers should consider in their interactions with women who were sexually abused as children.

In order to improve the perinatal care experiences for these women, practitioners should consider the following recommendations from care providers who have extensive experience in working with women who are CSA survivors:

AWARENESS OF A WOMAN'S ABUSE HISTORY

The first issue is that of awareness of a woman's CSA history, which is best obtained through sensitive screening. Women rarely disclose information about sexual abuse experiences to physicians, as indicated in as study of 523 women of whom only 5% of those with an abuse history had ever told a physician.[12] From another study of 164 patients, only 6% had been asked about sexual abuse (SA), although 68% favoured routine inquiry by physicians, and 89% felt that physicians could help with problems from SA.[6] Friedman and colleagues also found that 74% of the physicians they surveyed felt that they could help with SA-related problems, and one third felt that screening should be routine, yet screening for SA occurred at only 11% of initial visits and 15% of annual visits.[6] The abused patients in Friedman's study were less likely to volunteer information about their CSA history, and were more likely to favour direct questioning by the practitioner. Karen Holz asserts that by not asking, the care provider gives subtle support to the inaccurate belief that the patient may have – that abuse doesn't matter, should not have long-term effects, and isn't worth mentioning.[9] Abused women consulted in qualitative studies say that screening should occur in a private setting with ensured confidentiality, when the woman is sitting upright and fully clothed, and be accompanied by reassurance that it is normal for her to have difficulty with aspects of clinical care, and that efforts will be made to help her cope with necessary procedures and treatments.[7,9,17] The majority of abused women favour routine screening, and an even greater proportion of women endorse routine screening within a safe environment by a practitioner with adequate training or experience to respond sensitively when a woman discloses an abuse history.

Simkins' and Holz's years of experience working with women taught them that not all abused women disclose their history even when directly asked. Many women do not have conscious memories of their abuse or choose not to disclose initially.[8,9,18] They suggest that care providers should suspect a CSA history in patients with the following behavioural clues – addictions, self-destructive tendencies, multiple somatic complaints without physical cause, poor self esteem, phobias (particularly of blood, needles, pelvic exams, hospitals, medical procedures, undressing), sexual dysfunction and inappropriate affect, boundary confusion and anxiety, control issues (including shutting down labour progress at a level of pain where she can maintain control), unwillingness to trust authority figures, and flashbacks or body memories with associated PTSD-type symptoms. Even if it is not openly acknowledged, a CSA history may have profound implications in a woman's life, many of which will influence her interactions with health care providers.

Building a sensitive, trusting relationship is particularly important to the quality of perinatal care experiences for women who have been abused. Sensitivity to the wide-ranging and long-term effects is crucial, as are honesty and clarity in all interactions. Trustworthiness in this setting requires consistency of care and character, and accessibility within predetermined boundaries. It is important to allow time for questions, to be empathic, and to provide positive reinforcement to these women that helps to normalize their experience while acknowledging and addressing their particular challenges.

A WOMAN WITH A HISTORY OF CSA MAY NEED MORE EXTENSIVE EDUCATION ABOUT THE PHYSICAL ASPECTS OF PREGNANCY AND CHILDBIRTH

Women with a history of CSA may need more extensive education about the physical aspects of pregnancy and childbirth, as well as extra encouragement in self-care during pregnancy, since many respond to their abuse by becoming alienated from or ambivalent about their bodies.[2] A woman's pregnancy and perinatal period is less likely to be traumatic if she is empowered in decision making with respect to her body and her care plan.[9] Thus, emphasizing choices and informed consent for all procedures is essential.[8,9] Inviting patients to bring their partner, friend or family member to appointments if they would prefer that to an office staff witness for procedures may be appreciated. Clear and thorough explanations – both before and during all procedures helps women to understand what is happening, and less likely to feel as though they are being violated while in a defenceless position. Practitioners should inquire about and respect the patient's wishes regarding the gender of care provider when making a referral, since choosing a female caregiver is one way survivors may alleviate their fears.[8,16] Language and word choice can also trigger abuse memories, particularly paternalistic directives and the use of slang.[20] Postnatal issues for CSA survivors may include breastfeeding difficulty, interpersonal adjustment issues with their partner to new roles in the family, fears about the 'cycle of abuse', and difficulty trusting their male partners with the baby.[8,11] Parenting classes or groups are often a valuable source of information and support for these new families. In some cases, particularly if the abuse memories surface for the first time during the pregnancy or if the implications pose a danger to the woman or the fetus, it would be advisable to suggest a referral to a counsellor with expertise in the area of abuse to complement medical care.

While the challenges abound, pregnancy and childbirth can also be a very positive and affirming time for CSA survivors, as it provides an opportunity to learn more about their bodies, take more control over their physical well-being, and experience their bodies as capable, strong, and creative. Health care professionals, particularly those who interact with women throughout their childbearing years, are in a unique position to build trusting rela-

tionships that empower women with respect to their bodies. Such interactions facilitate perinatal experiences which counteract the abuse outcomes, instead of perpetuating and amplifying the detrimental sequelae of CSA.

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The Motherisk Program – Now at UWO

Gideon Koren, MD, FRCPC, Ivey Chair in Molecular Toxicology, UWO

One of the most challenging aspects of drug therapy is the situation of pregnant women taking medications or exposed to chemicals. Since the thalidomide disaster it has become apparent that medications which are safe to the mother may be detrimental to the developing baby. Common sense may suggest that women who are pregnant should not use medications or be exposed to chemicals. Sounds simple, but in fact this situation is very complex in "real life" for the following reasons:

- Half of all pregnancies are unplanned; hence millions of women expose their fetuses to medications.
- Often untreated maternal illness may harm both mother and unborn child.
- Many women are addicted to recreational chemicals and cannot discontinue their use.
- Millions of women are occupationally exposed to chemicals.

To address the need for information and counseling for pregnant women, we have established in 1985 the Motherisk Program at the Hospital for Sick Children in Toronto. Presently the Program counsels up to 200 women and health professionals a day from coast to coast, as well as from all parts of the world, (www.motherisk.org). Motherisk is one of very few such programs worldwide and by far the largest.

In addition to counseling, prospective follow-up of pregnancy outcome has led us to the development of the largest database worldwide and to the publication of more than 400 peer reviewed scientific papers. In parallel, the 70 team members and students of Motherisk systematically review all world experience on drugs and chemicals during pregnancy and breastfeeding.

Lastly, being based in a clinical pharmacology/toxicology program, Motherisk operates a large research and clinical laboratory to study drug exposure during pregnancy and lactation. Our laboratory pioneered the measurement of drugs of abuse in neonatal hair and meconium (the first neonatal stools) as a long term "memory" of the drugs the baby "saw" in utero.

THE IVEY CHAIR

In July 2004 Motherisk arrived at UWO, as I joined the Faculty of Medicine and Dentistry as the Ivey Chair in Molecular Toxicology, sharing responsibilities between Toronto and London. Together with Drs. Doreen Matsui, Michael Reider, David Freeman, David Knoppert and many others at UWO, we are establishing an enlarged network that will invite all Canadian researchers interested in developmental toxicology to work together.

This will spell exciting new opportunities to interested students at all levels of education at UWO. The Ivey Chair has developed the first UWO course in Medical Toxicology to be offered in September 2005. We are already participating in both undergraduate and postgraduate training of medical toxicology. This Chair, together with the new Ivey Chair in Ecohealth research and other members of the UWO research community, will embark on an exciting research collaboration in how we poison our environment and are then being adversely affected by it. This issue is near and dear to all of us, but has only been sparsely addressed.

Human Toxicology, related to medicinal drugs or from environmental chemicals, is a field that transcends beyond medical sciences. It should include scientists in geography, biology, engineering and social sciences, to mention a few. The Ivey Chair will facilitate such dialogue, hopefully making UWO a leader in how to ensure safer use of medications and a safer environment.

The contact information for the Ivey Chair is:
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For the Vision and detailed plan of the Ivey Chair please visit www.med.uwo.ca/MolecularToxicology/TheIvey-Chair-in-Molecular-Toxicology.

Ocular Manifestations of Pre-eclampsia

Chetna Tailor, Meds 2004

Pre-eclampsia is an acute condition of pregnancy characterized by hypertension, proteinuria, and non-dependent edema (hands and face). The condition progresses to eclampsia when these symptoms are accompanied by grand mal seizures. It is fortunate that neither of these conditions manifest themselves prior to the third trimester of pregnancy, as delivery of the child is the only definitive treatment. Approximately 10% of pre-eclamptic women will develop the HELPP syndrome (with or without progressing to eclampsia), characterized by hemolysis, elevated liver enzymes, and low platelets. Although the cause of pre-eclampsia is unknown, it is well accepted that the underlying pathophysiologic abnormality resulting in the condition is due to generalized arteriolar constriction or vasospasm. This, in turn, induces differing degrees of capillary damage, resulting in protein extravasation and hemorrhage.[1] Almost every organ system can be affected by this vascular abnormality by sustaining damage via hemorrhage and necrosis secondary to arteriolar constriction.[2]

The visual system is not exempt from being affected by pre-eclampsia. The condition has been known to affect the conjunctiva, retina, retinal vasculature, choroids, optic nerve, and the visual cortex.[2] The most common of these effects manifest as the following symptoms: blurred vision, photopsias (flashing lights), scotoma, diplopia and blindness. Examination and investigations of women with pre-eclampsia have found that these symptoms result from retinal arteriolar abnormalities, serous retinal detachments, ischemic optic neuropathy, and cortical blindness.iii Ocular findings associated with the HELPP syndrome include bilateral serous retinal detachments with yellow-white subretinal opacities as well as vitreous hemorrhage.[3] The mechanisms that induce these changes, resulting in the above-mentioned visual symptoms, have not been fully elucidated as of yet. It has been suggested, however, that retinal changes may be due in part to systemic vascular diseases such as diabetes and chronic hypertension - comorbidities possessed by many pre-eclamptic or eclamptic patients. Hormonal changes as well as breakthrough in cerebral autoregulation have also been suggested as possible contributors to ocular symptoms in these conditions.[4]

RETINAL ABNORMALITIES

The most common retinal abnormality found in pre-eclamptic patients is focal arteriolar spasm and narrowing which may be associated with peripapillary or focal areas of retinal edema.[4]

Serous retinal detachment occurs in 1% of pre-eclamptic patients and 10% of eclamptic patients.[4] In a non-preeclamptic individual the condition is thought to occur as a result of a defect in the retinal pigment epithelium. This defect leads to focal leakage of fluid from the choriocapillaris which in turn potentiates serous detachment of the sensory retina (figure 1 and 2).[5] In patients with severe pre-eclampsia or eclampsia, serous retinal detachment has been associated with yellowish, opaque retinal pigment epithelium lesions. It has been theorized that these lesions result from choroidal ischemia or infarction. Fluorescein angiography in such patients has supported this theory by revealing that these retinal pigment epithelium lesions correspond to areas of delayed choroidal filling.[6] This theory is further supported by the location in which most of these retinal pigment epithelium lesions occur - in the macular and peripapillary regions.

Previous studies have suggested that the close proximity of the macular region to the site at which many watershed zones of short posterior ciliary arteries and vortex veins meet renders it highly vulnerable to ischemic disorders.[6]

Hormones, coagulation, and hemodynamic processes are all thought to play a part in the pathogenesis of serous retinal detachment.[3] Hematologic changes in pre-eclampsia, including hemoconcentration and increased blood viscosity, lead to slowing of choroidal blood flow. As a result of the structure of the choriocapillaris, there is a rapid deceleration of flow as arterial blood moves into the vast network of the choriocapillaris. Under the circumstances of the hypercoaguable state associated with pregnancy, there may be a tendency for clots to precipitate in the choriocapillaris inducing choroidal ischemia. Angiospasm or occlusion of the choroidal arterioles may also occur. Choroidal ischemia induces ischemic edema, appearing as yellowish, opaque foci in the retinal pigment epithelium and deep retina. Serous retinal detachments develop subsequent to abnormal permeability of the damaged retinal pigment epithelium.[6]

Although opaque retinal pigment epithelium lesions and serous retinal detachments are commonly found together, they are also found in pre-eclamptic patients independent of one another. It has been suggested that less severe ischemia may alter retinal pigment epithelium permeability, inducing retinal detachment without subsequent retinal pigment epithelial edema and opacification. However, if there is sufficient ischemia to induce cell death, retinal detachment may not follow.[6]

Retinal pigment epithelial lesions and serous retinal detachments have been reported to resolve within three weeks in approximately 80% and 98%, respectively, of women with severe pre-eclampsia and eclampsia.[4] There is minimal or no pigmentary changes after the resolution of lesions in most cases, although pigmentary mottling, pigment clumping, and changes mimicking macular dystrophy have occasionally been observed. It is thought that delay in choroidal filling in most patients is of too short a duration to induce significant retinal pigment epithelial cell death and subsequent scarring.[6]

CORTICAL BLINDNESS

Blindness as a visual symptom of pre-eclampsia or eclampsia has recently been studied in greater detail. Historically, blindness was thought to have resulted from retinal abnormalities including edema, vascular changes, and detachment. More recently, case reports have emphasized *cortical blindness*, which is characterized by intact pupillary light reflexes and normal ophthalmoscopic findings.[7] Current studies correlating neuroimaging and post-mortem pathological findings have shown that transient cortical blindness results from petechial hemorrhages and focal edema in the occipital cortex. Transient scotomas have also been shown to result from these changes in the occipital cortex.[7] Most cases of pre-eclamptic blindness are now attributed to changes in the occipital cortex.[4]

Until recently, the exact mechanism behind the causation of cortical blindness was unknown; however, it was postulated to have occurred from either 1) cerebral vasospasm with ischemic injury, arteriolar necrosis, and cytotoxic edema, or 2) increased capillary permeability with leakage of fluid and proteins into the surrounding tissues resulting in vasogenic edema.[8] A recent case report of a pre-eclamptic woman who had suffered from transient blindness reported that the use of single-photon-emission CT revealed that the cortical blindness resulted from vasogenic edema with selective hyperperfusion of the posterior cerebral circulation.[8]

Previous studies have found that the posterior cerebral circulation contains fewer synapses with the sympathetic nervous system than does the anterior cerebral circulation, which could make the former more susceptible to breakthrough of autoregulation (a suggested mechanism of cortical blindness).

Two possible mechanisms by which cerebral autoregulation may be overcome by severe hypertension have been suggested. The first is overregulation, in which severe cerebral vasoconstriction leads to the lesions seen. The second theory is of breakthrough, which proposes that there is a loss of cerebral vascular regulation with resultant dilatation leading to focal vasogenic edema. This mechanism is supported by the fact that symptoms and neuroimaging findings are concentrated in the region of the posterior circulation (which is more susceptible to breakthrough of autoregulation).[9]

Cortical blindness due to pre-eclampsia or eclampsia is almost always a transient phenomenon with reports of blindness lasting 4 hours to 8 days.[4]

CONCLUSION

Pre-eclampsia and eclampsia are associated with an increased incidence of a number of visual changes, including serous retinal detachment and blindness. Most of these changes have no specific treatment in lieu of inducing labour (most disturbances resolve postpartum). During the careful monitoring of such a patient by an obstetrician, the patient's visual activity and fundi should also be evaluated. If visual compromise is detected, the patient should be referred to an ophtalmologist for further evaluation.[2]

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Maternal Hypothyroidism in Pregnancy: The Neurodevelopmental Manifestations in the Offspring

Natalie Kotowycz, Meds 2005

Thyroid hormones are critical in regulating growth, development and metabolic rate. They are also implicated in embryogenesis, fetal maturation and neurodevelopment. Recent studies have examined the clinical manifestations of a lack of thyroid hormone in pregnancy on infant and childhood neurodevelopment. Thyroid hormone deficiency in pregnancy has been implicated in delayed psychomotor development, altered rates of information processing as well as lower IQ in the offspring. This article reviews some of the critical studies that have examined the neurocognitive manifestations of a lack of thyroid hormone in pregnancy. It highlights the importance of carefully monitoring preexisting thyroid conditions when treating pregnant women and also emphasizes the significance of thoroughly investigating suspected cases of thyroid dysfunction in pregnant women.

The thyroid gland is responsible for the production of two hormones, triiodothyronine (T3) and thyroxine (T4). These hormones play a pivotal role in regulating metabolic rate, growth and development. They have also been found to be of chief importance in embryogenesis as well as in fetal maturation and neurodevelopment.[1]

The fetal thyroid gland can be recognized by 7 weeks gestation and it begins sequestering iodine and synthesizing T4 by 8-10 weeks. The T4 however is not secreted until 18 to 20 weeks.[1] In contrast, T3 and TSH production and secretion are noted by 12 weeks.[2] It is because the T4 is not secreted until the 18th to 20th week of pregnancy that the fetus relies on the passage of maternal thyroid hormone through the placenta. It is interesting to note that human coelomic fluid has been found to contain maternal T4 as early as the fourth week of gestation.[3] Fetal development is therefore intricately related to the availability and placental passage of maternal thyroid hormone.

Although maternal thyroid hormone levels may fluctuate to some extent through the course of a pregnancy, the body seeks to keep them within a narrow range. Nevertheless, 2.5% of pregnancies are associated with mild maternal hypothyroidism, which is characterized by an elevated serum TSH.[4] Uncontrolled hypothyroidism in pregnancy is comparatively rare, but it is associated with serious complications including low birth weight, preeclampsia as well as an increased risk of spontaneous miscarriage and perinatal mortality.[5] In view of the fact that fetal development is in part dependent on maternal thyroid hormones, maternal thyroid deficiency is also manifested by neurological and developmental delays during infancy and childhood. It is for these reasons that physicians must recognize the significance of periodic thyroid hormone screening in pregnant women with a positive family history of thyroid disease, goiter, nodules or thyroid conditions. The following is a synopsis of various studies that have examined the specific manifestations of maternal hypothyroidism in pregnancy on infant and child neurodevelopment. A primary focus is placed on the role of thyroid hormones in psychomotor development, information processing, and IQ.

In 1999, a study conducted by Pop et al. examined 220 children at 10 months of age using the Bayley Psychomotor Developmental Index.[6] All of the children in the study were born following uncomplicated pregnancies and at 12 and 32 weeks' gestation, the mothers had their fT3, fT4 and TPO antibody status measured. The study found a significant positive correlation between the infant's PDI score at 10 months and maternal serum fT4 concentration at 12 weeks' gestation. Appreciably lower scores on the Bayley Psychomotor Developmental Index were seen in the infants born to mothers who at 10 weeks' gestation had fT4 levels below the tenth percentile. Evidently, low maternal fT4 levels in early pregnancy may have detrimental effects on the infant's psychomotor development.

An additional study conducted in 1999 evaluated the effect of intrauterine and neonatal thyroid hormone deficiency on infant cognitive abilities.[7] This study assessed infant attention, learning and memory. The infants examined in this study suffered from thyroid hormone deficiency for one of the following reasons: maternal hypothyroidism, maternal hyperthyroidism with concomitant anti-thyroid treatment, low-risk prematurity and congenital hypothyroidism. Results indicated that sustained attention and learning at 6 months of age did not differ between the study group and controls; however, a statistically significant difference was seen in the area of general attention and reaction time. The study group was less attentive and had longer reaction times; the latter signifies an altered rate of information processing in the infants exposed to thyroid deficiency.

A study conducted by Haddow et al. examined the relationship between maternal thyroid hormone levels in pregnancy and subsequent IQ scores in children.[8] In this study, serum was collected from 25 216 pregnant women and the women were divided into categories based on their serum TSH levels. Forty-seven women with TSH levels above the 99.7th percentile and 15 with TSH concentrations between the 98th and 99.6th percentile agreed to participate in the study. When the children were between the ages of 7 and 9, they were asked to perform 15 tests of neuropsychological function and the effects of maternal thyroid status in pregnancy on the children's developmental scores were assessed. In particular, the tests examined language, reading, visual-motor performance, attention and intelligence. The children of hypothyroid mothers performed worse than controls on all 15 tests. Word discrimination and attention problems were significantly worse in the study group. More specifically, 37% of the children born to hypothyroid mothers versus 19% of controls had attention problems. Most notably, IQ scores were found to be 4 points lower in the study group when compared to controls. On this note, 15% of the study group versus 5% of controls had IQ scores less than 85. Similarly, 23% of children born to hypothyroid mothers had learning difficulties at school; this was double the rate seen in the control group. Evidently, hypothyroidism in pregnancy is not only associated with problems in psychomotor development and alterations in information processing but is also coupled with poorer school performance and lower scores on intelligence tests.

The physiological and anatomical bases of the behavioral and intellectual deficits associated with maternal hypothyroidism in pregnancy are complex. To date, animal studies have shown that although rats born to hypothyroid mothers have a normal brain weight, they have abnormalities in brain amino acid metabolism and in the enzymes of glial and neuronal cells.[9] Furthermore, these rats have decreased dopamine concentrations in the cerebellum, pons, medulla and cerebral hemispheres; the latter is also associated with a reduced serotonin concentration.[10] In addition, the cerebellar cortex has distorted Purkinjie dendritic trees that are characterized by shorter branchlets and areas of missing spines.[11] It is likely that similar pathways and anatomical abnormalities account for the neurodevelopmental delays exhibited in infants and children born to hypothyroid mothers. A human study that examined 13 children born with congenital hypothyroidism, for which early treatment was sought, found that at age 8 EEG patterns in 5 of the patients were indicative of dysfunction in the right parietal and left frontal regions.[12] Taken together, these findings suggest that thyroid hormones play a vital role in the development of brain structures and neurological pathways, which then serve as the foundation for learning, behaviour and intelligence.

Physicians need to realize that the effects of maternal hypothyroidism in pregnancy on infant and child neurodevelopment can be detrimental. In May 2002, the American College of Obstetricians and Gynecologists, ACOG, developed a practice guideline on thyroid disease and pregnancy. Although the ACOG believes it is premature to recommend universal hypothyroidism screening in pregnant women, it feels that screening with a TSH test is highly warranted in women with a history or symptoms of thyroid disease. Similarly, pregnant women with a suspected goiter or thyroid nodules should be further evaluated for thyroid dysfunction.[13] Many patients with a history of hypothyroidism will also require increased doses of levothyroxine during pregnancy and for this reason, in such patients, TSH levels need to be assessed during each trimester. Physicians need to ensure that a normal thyrotropin concentration is being maintained and that any dose adjustments are being made appropriately.[14] Physicians need to be very attentive to conditions of thyroid dysfunction and subtle thyroid hormone abnormalities when treating pregnant women. It is essential that they be aware of the common nature of thyroid disease in women and the detrimental effects that thyroid dysfunction can have on the pregnancy itself as well as the subsequent neurodevelopment of the offspring.

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Fetal Surgery: A Review

Sandeep K. Aggarwal, Meds 2006

Fetal surgery is one of the most exciting fields that has emerged in recent decades. Bridging a multitude of disciplines including obstetrics, paediatrics, surgery, and radiology, the potential of fetal surgery to correct those diseases that once frustrated clinicians and surgeons is incalculable. Fetal surgery is based on the idea that diseases and malformations that are too late to treat after birth can be corrected prenatally. Such diseases include diaphragmatic hernia, myelomeningoceles, and hydronephrosis. This article reviews some of the important motivations and developments for fetal medicine and surgery as well as briefly outlining and discussing two operative techniques: FETENDO and open fetal surgery.

EVOLUTION OF FETAL SURGERY

The fetus has long been shrouded in mystery, inaccessible to the interventions of the physician. It is only because of developments made in the last few decades of the 20th century that we are now able to view and treat the fetus as a patient. Perhaps the most important initial development was the introduction of sonography, which had the advantage over x-rays as being safer and less invasive to the fetus and mother. Ultrasound allows accurate imaging of fetal anatomy, which can be measured to determine normal and abnormal features. In addition, ultrasound allows live imaging so that the sonographer can see the fetus move parts of its body or even visualize the beating of the heart. This real-time technique is also employed in numerous intrauterine procedures such as amniocentesis, needle puncture, and tissue sampling. This helped form the basis for prenatal testing to find inherited diseases and malformations which could lead to abortions if the disease was serious enough or relief if the test was negative. That was, therefore, the crux of the matter: technology had allowed physicians to detect many prenatal diseases, but beyond the ability to administer drugs and hormones to treat diseases like congenital hypothyroidism, they remained powerless to treat anatomic defects in utero[1].

The reason treatment in utero was so important came from the work of neonatologists and surgeons who studied the pathophysiology of the malformations they saw at birth and followed their development back into the womb. These physicians were frustrated in the clinics by newborns with devastating malformations they could do nothing about. In other words, they felt that whatever treatment they could provide was too late to be effective, and they needed to intervene earlier to change the course of the disease. Human disease models were created in fetal animals and the pathophysiology and effects of in-utero intervention were studied. In addition, obstetricians and sonographers were refining their techniques to detect and study the development of anatomic malformations using ultrasound. Thus, as these two investigations merged, the pathophysiology of human fetal diseases such as hydrocephalus, hydronephrosis, diaphragmatic hernia, and nonimmune hydrops were defined, and the field of fetal medicine was born[2].

During the 1980's and 1990's, new technologies, clinical trials, and techniques were developed at a few elite centres that had the ability to perform such complicated surgeries. The progression of fetal surgery as a safe, effective technique remains slow, and there have been many setbacks. However, there were some firsts that drove research into the field further. Such milestones included the first successful open fetal surgery in 1983, the first successful repair of a diaphragmatic hernia in 1989, the development of fetoscopic technology in 1995, and the first myelomeningocele repair in 1997. Currently, successful fetal interventions have been made to correct cystadenomatoid malformations of the lung, sacrocygeal teratoma, and neural tube defects[3].

As technologies and techniques advance, the potential to correct more anomalies will increase, but it must be remembered that it is an experimental technique and still has the potential to do the fetus a great deal of harm. Furthermore, ethical considerations must be addressed, underscoring the necessity for proper guidelines to ensure the proper use of such procedures. In any case, the formation and growth of such professional societies as the International Fetal Medicine and Surgery Society (IFMSS), which determine the guidelines for fetal treatment, is evidence that fetal surgery now has a firm foundation for future growth[2].

OPERATIVE METHODS

Fetoscopic Surgery: Fetendo

A minimally invasive technique, fetoscopic surgery has advantages over open fetal surgery which include the prevention of preterm labour and altered fetal homeostasis due to the procedure as well as the use of local anesthesia[4]. Fetoscopic surgery is based on endoscopic techniques; in other words, to perform a procedure normally done with open surgery using a minimal incision and hence, less morbidity is likely to occur. Being an endoscopic technique, fetoscopy has many of the same considerations, such as the imaging modality, the manner of access, the environment, and the instruments used. Many of these variables are similar to conventional endoscopy save for a few alterations and challenges. For instance, fetoscopy has the added advantage of using two imaging modalities: the endoscope and ultrasound. Furthermore, while most endoscopic techniques use a CO_2 gas-filled environment, this is toxic to the fetus and therefore a fluid environment is instituted and thus involves a greater adaptation of the endoscopic technique. The complications that can arise from this technique are bleeding from the uterine wall or placenta and rupture of membranes and amniotic leakage[5].

The process of minimally invasive fetal surgery without hysterotomy is called FETENDO and can be employed in a plethora of correctional interventions such as the repair of diaphragmatic hernias, obstructive uropathies, twin-twin transfusion syndrome, myelomeningocele, and cleft lip. FETENDO involves less uterine trauma and irritation and thus minimizes the chance of preterm labour or severe disruption of fetal homeostasis. As a result of decreased chance of preterm labour, the use of tocolytics is also decreased as is subsequent maternal hospital stay and complications due to tocolytics[6].

The procedure involves anesthetization of the mother and fetus with halogenated agents to increase uterine relaxation. The mother is placed in a modified lithotomy position with her legs low enough so three surgeons can work from each side. Ultrasound is used to determine whether the procedure can be performed percutaneously or by maternal laparotomy and uterine manipulation, depending on the position of fetus and placenta. It is also used to find the optimal position to place the trocars. Trocar placement and their later removal are crucial steps in the surgery, as incorrect insertion and removal can result in uterine bleeding or membrane rupture. There are many difficulties associated with FETENDO, which include the unfamiliar fluid environment, positioning of the fetus during repair, and accurate imaging[7].

Open Fetal Surgery

There have been over 120 open fetal surgical cases in humans, and the technique can and has been used to correct many prenatal malformations, including those done by FETENDO. As with any open surgical procedure, open fetal surgery via hysterotomy is associated with an increased risk of preterm labour. In addition, because open fetal surgery requires the exposure of the fetus to the open environment, hypothermia and disturbances in fetal homeostasis may result in increased mortality or morbidity. On the other hand, open fetal surgery does not have some of the same limitations as FETENDO, such as the need for special instruments, the difficulties with a fluid environment, positioning of the fetus, and imaging[2].

In general, the procedure involves several steps: hysterotomy, fetal exposure, correction, closure, and postoperative care. Halogenated anesthetics, indomethacin, and antibiotics are given before the surgery. The mother is placed in the supine position and cardiac and perfusion monitors are placed. A low transverse abdominal incision exposes the uterus and ultrasound is used to find the placenta and fetus. The uterus is opened utilizing staples to preserve homeostasis and prevent membrane rupture. The fetus is continuously bathed in warm saline as it is exposed and attached to monitoring devices. Once fetal repair is completed, absorbable sutures and fibrin glue are used to close the uterus, and warm Ringer's solution is used to replace amniotic fluid[2].

DISCUSSION

The gift that fetal surgery provides for its young patient is a life without the consequences of devastating malformations that are difficult to treat after they are born. While the procedure is still widely experimental, the lessons and complications observed from initial open fetal surgeries will eventually be used to promote less invasive FETENDO procedures to correct a growing number of diseases. The transition from open to FETENDO surgeries will depend on further interest and experience, more clinical trials, and continued technological development. Regardless of the method, new diseases can be added to the fetal surgeon's repertoire only after their pathophysiology has been clearly elucidated in animal models, underscoring the necessity for further research. Furthermore, while the procedure is an exciting one, especially to desperate parents seeking a solution, the guidelines introduced by IFMSS must be considered in each case. Continued growth of fetal surgery relies upon continued development of fetoscopic techniques and study of the pathophysiology of fetal malformations, risk factors, and outcomes.

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The Next Wave - Medical Education Without Borders

Sherryn Rambihar, Meds 2005

The devastating tsunami of December 2004 was a reawakening of global consciousness. The images of swirling chaos impelled us to a tsunami of support worldwide, a global heart emerging, bringing nations, communities and people together.[1] Jeffrey Sachs, director of the Earth Institute at Columbia University and author of The End of Poverty, speaking about the unprecedented global response said "a world divided by ethnic and religious disputes suddenly faced its common humanity – and common mortality – in a disaster of shocking geographic reach… is now united to aid millions of vulnerable people trying to piece their lives back together in the wake of the devastation."[2]

By redefining our world, this tsunami has forced us to rethink our reach. Caring and humanity does not stop at our doorstep. As future physicians caring for humanity, we now have additional responsibility for involvement further afield. A tsunami a world away crashing into our consciousness means the death of distance and an opportunity and responsibility for a more global thinking and involvement.

The previous issue of the UWOMJ featured an editorial on the new subdiscipline of Peace Through Health, elucidating the unique role which health care workers have in promoting peace by pursuing health, given the downward spiral of war and disease, positive symbiosis of peace and health, and superordinate goals such as altruism and justice which motivate those in our vocation. Peace through Health looks at the complex systems contributing to peace and conflict such as social, political, economic and legal ecosystems, and seeks to find global multi-level interventions for global problems. Our earliest Peace through Health initiatives at Western inspired the development of UWO's Global Health Curriculum, as part of a much larger movement within medicine and medical education, towards a better ecosystem or complexity science understanding of global health and global concern, as evidenced in the global heart emerging after the tsunami.

Physicians in Canada are challenged by the changing needs of a dynamic, pluralistic patient population. Statistics Canada's new projections for 2017 show that Toronto's ethnic composition will be over 50% visible "minority," and schools and educational training programs are talking about the importance of preparing their graduates with cultural competency skills to thrive and survive in this world.[3] Harvard Medical School has developed a cultural competency in women's health training program to train faculty to teach about providing culturally competent care for minority and underserved women, in collaboration with partner universities and backed by the US Dept of Health and Human Services. International health issues also affect our clinical practice of medicine, and medical school, the training ground for future physicians, should provide opportunities to acquire the knowledge, skills and attitudes to better understand and manage our patients' health. The patient-centred ecosystem model espoused at UWO reminds us of the multifactorial and complex dynamic influences

on an individual's experience of health and disease and an international or global health perspective provides a broader context within which all these interactions can take place.

While as medical students we are taught to seek optimum health and quality of life for each patient, in practice our responsibilities extend far beyond the individual. Rudolph Virchow noted that "medicine is a social science, and politics nothing but medicine on a grand scale"[4] and this becomes our reality in practice. September 11 was a "wake-up call that there was a world out there full of poverty, injustice and violence which we couldn't divorce ourselves from."[5] The events beginning Sept, 2003 in a rural village in China spiraling to the SARS epidemic around the world taught us that we are not immune to events hundreds of miles away. Gro Harlem Brundtland, Director General of WHO, recently said: "In the past, desperate conditions on another continent might cynically be written out of one's memory. The process of globalization has already made such an option impossible. In the modern world, bacteria and viruses travel almost as fast as money. With globalization, a single microbial sea washes all of humankind. The separation between domestic and international health problems is no longer useful."[6]

There is now a moral imperative to educate medical students about the vast differentials in health between and within countries. North/South inequities in health spending,[7] and gross disparities in the global burden of health and disease are only two of the many important issues impacting health that should now engage us. The first step towards achieving this is an increased awareness through education.[8] Other important ways to include international health in medical education include reassigning global research priorities, fostering a culture of understanding and social justice amongst medical students, and promoting interdisciplinary approaches to health problems, noting the impact of socioeconomic inequality on individual and population health. Issues that are international in origin intimately affect the Canadian health sector,[9] and effective public health approaches must be both local and global.

"Medical schools should provide both theoretical training and research opportunities on the health consequences of conflict" states the Hague Appeal for Peace, adopted in 1999 by the United Nations. Health Canada's "Social Accountability – A Vision for Canadian Medical Schools"[10] and recommendations in the Health Care and Globalization chapter of the Romanow report[11] resonate with the current global discussion within academic and clinical medicine. Exploration of these issues has historically been relegated to extracurricular medical student activities[12] and the medical literature suggests that in-depth in-class teaching is rare[13]. However, medical students worldwide are leading a transformation to include global issues in the medical curriculum at local, national, and international levels.[14]

Schulich UWO Medical School has made important strides in this movement to harness the idealism and instincts inherent to young physicians, while improving health worldwide. A student-driven, interdisciplinary global health curriculum has emerged from our first Peace through Health involvement and has developed and grown in scope and vision over the past three years.

The Faculty of Medicine and Dentistry began by incorporating a case study highlighting Human Rights, Human Conflict, Human Health: a Global Approach to Public Health as part of a Yr IV Ecosystem Health selective in May, 2002. Designed by Ashifa Jiwa (UWO Meds 2002), this case study, the first of its kind in Canada, examined connections between human rights, peace building and health care in case-based, interactive modules.[15]

To work towards our goal of international health issues spanning the medical undergraduate curriculum, we then looked to Community Health (formerly Health, Illness and Society), an interdisciplinary course that extends over the entire four years of the medical curriculum. Elective lectures and panel discussions were given on peace-through-health issues to first and second year students. Patient-Centred Learning was another route used to address international health issues in our medical undergraduate curriculum, and students in all four years of medical school working with committees on Gender, Equity, Diversity, Women's Health and Ecosystem Health, discussed cases of the week and tried to retain inherent medical aspects while adding extra layers of social and political context conducive to self-study and small-group PCL discussions. Symposia open to interested faculty and medical students included guest speakers Dr. Joanna Santa-Barbara of McMaster School of Medicine and Dept of Peace Studies, Dr. Graeme MacQueen of the McMaster Institute for Peace Studies, and Dr. Neil Arya, President of the Physicians for Global Survival.

Arising out of the overwhelming interest in international health issues and opportunities, the UWO Global Health Interest Group strives to coordinate curriculum enhancement with the many existing extracurricular international health opportunities within and beyond the medical school community. The UWO Global Health Interest Group is affiliated with our international health counterparts at Canadian medical schools, the Canadian Student University Network for Social and International Health (SUNSIH) and Physicians for Global Survival Student Network. Activities are open to the general medical school community, and medical students at large can choose their degree of involvement in projects of interest. Activities to date have included a Speaker Series featuring workshops and talks on topics such as *Challenges in International Women's Health, Empowerment in International Health Development, Rural Health Issues in the Developing World*, educational displays and film presentations to medical students on AIDS, Hiroshima, and poverty in India, an inter-university collaborative project with WarChild teaching London high school students modules on *Health, Human Rights and Sanctions*, and *Sexual Violence in Conflict and Genocide* and training teachers within the Thames Valley school board, an international health forum for sharing international health clinical experiences and exchanges, partnership and fundraising strategies with medical outreach groups including MedOutreach India, Medical Student Initiatives in China and Med Outreach Tanzania, organizing a book drive for the Kabul library project and fundraising for the IFMSA Cote D'Ivoire Medical Student Relief. These are just a few of the many initiatives of the Global Health Interest Group, and as interest and participation continues to grow, so too does leadership capacity and experience for current and future international health experiences within and beyond medical school.

It is exciting to be involved with the UWO Global Health Interest Group at a time when International Health is becoming increasingly important worldwide. The International Federation of Medical Students Association (IFMSA) is comprised of students from over 80 countries, and has portfolios addressing Refugee and Peace Issues, Reproductive Health and AIDS, Public Health, Clinical Exchanges and Medical Education Projects. In Sweden at the Karolinska Institute, a full-time five week elective has become the most popular elective course in the curriculum, taken by over half of the students. The aim is to teach how socioeconomic, cultural, and environmental factors determine the health of nations and how the global burden of disease and demographic patterns vary between and within countries. The last 2 weeks of the course are given in Tanzania, India, or Cuba, where the students are taught by local health professionals, and visit hospitals and health centres. In the United States, the US-based International Health Medical Education Consortium (IHMEC) was founded in 1991 "to foster international medical education in... curriculum, clinical training, career development, and international health education policy." The American Medical Students Association (AMSA) has developed global health education modules, a comprehensive curriculum in integrative medicine started in 1992 at the University of Arizona[16] and there are collaborative international medicine programs between Columbia University and Ben Gurion University.[17] In the United Kingdom, MedAct, an organization of health professionals that researches and lobbies on global health issues, has produced a global health studies curriculum pack which has been used in several medical schools already. International Health and Medical Centres introduce global health to undergraduate students, and a BSc in International Health has been created at University College, London.[18] In the Netherlands, medical faculties of two universities in Amsterdam have recently begun an elective course entitled "Health and issues of war and peace."[19] Closer to home, the Association of Canadian Medical Colleges is including a special session on Global Health issues at the Annual Meeting in May 2005, and medical educators have been interested in learning about ways to integrate global health issues into medical curricula as seen by presentations of the UWO Global Health initiative at the Royal College Annual General Meeting and the upcoming May 2005 Ontario Medical Education Network Research Symposium. Medical schools may be better able to respond to the challenges of their global-minded students with increased awareness of these issues.

The tsunami was a defining event that changed us forever. It made us rethink the world, bringing other global isues to our consciousness: the life and death disasters of the poor far away, the famines in Darfur, violence and starvation in the Congo, the mudslides in British Columbia, flooding and waterborne epidemics in Guyana, among many others. While as physicians we seek the best health for our patients, we should also strive for the health of systems to improve global health and the global state of wellbeing. We are no longer just onlookers from a distance; the tsunami changed all that. We are now part of the global heart emerging and can all be advocates for change. It has been inspiring to be a part of the collective engagement of our medical community here at Western, introducing global perspectives, and I look forward to the new wave emerging after the tsunami, of global heart and medical education without borders.

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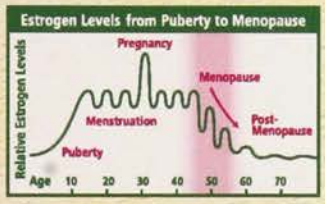

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